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THE NATIONAL CONFERENCE ON THE NEED FOR A RENEWED CONCEPTION OF VOCATIONAL AND TECHNICAL EDUCATION, HELD IN MAY 1965, ASSEMBLED SPECIALISTS FROM INDUSTRY, GOVERNMENT, AND EDUCATION TO EXAMINE THE MAJOR ISSUES AND CONCERNS OF VOCATIONAL AND TECHNICAL EDUCATION. MAJOR EMPHASIS WAS PLACED ON THE RAPID CHANGES IN VOCATIONAL EDUCATION AND PRESENT CONDITIONS THAT REQUIRE A REFOCUSING OF ENERGIES IN THE DEVELOPMENT OF NEW CURRICULUMS AND PHILOSOPHIES OF INSTRUCTION. THE DIALOGUE OF THE CONFERENCE CONCENTRATED ON THE IMPLICATIONS OF OLD AND NEW VOCATIONAL PROGRAMS IN THE SECONDARY SCHOOLS, COMMUNITY AND JUNIOR COLLEGES, AND UNIVERSITIES. THE PAPERS PRESENTED IN THIS DOCUMENT ATTEMPTED TO IDENTIFY THE MAJOR ISSUES IN VOCATIONAL AND TECHNICAL EDUCATION AND THE DEMANDS MADE ON EDUCATIONAL INSTITUTIONS TO RECOGNIZE THE NEEDS IN THE PRESENT AND FUTURE WORLD OF WORK. PAPERS PRESENTED WERE (1) "WHAT IS VOCATIONAL AND TECHNICAL EDUCATION," BY CARL J. SCHAEFER, (2) "KEY ISSUES AND PROBLEMS IN VOCATIONAL AND TECHNICAL EDUCATION," BY ELI GINZBERG AND DALE HIESTAND, (3) "THE VOCATIONAL EDUCATION OF THE SEMISKILLED," BY DONALD SUPER, (4) "WORK AND VOCATIONAL EDUCATION," BY CHARLES DE CARLO, (5) "LABOR FORCE TRENDS AND THE COURSE OF VOCATIONAL EDUCATION," BY SEYMOUR WOLFBEIN, AND (6) "VOCATIONAL EDUCATION FOR A CHANGING WORLD," BY PAUL ROSENBLOOM. THIS DOCUMENT IS AVAILABLE FOR $1.25 FROM TEACHERS COLLEGE PRESS, COLUMBIA UNIVERSITY, 525 WEST 120TH STREET, NEW YORK, NEW YORK 10027. (WB)

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Jerry M. Rosenberg

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New Conceptions of Vocational and Technical Education

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Vocational and Technical Education

Jerry M. Rosenberg, Editor

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Introduction

The National Conference on the Need for a Renewed Conception of Vocational and Technical Education, held in May 1965, at Lake Mohonk, New York, under the sponsorship of Teachers College, Columbia University, brought together specialists from industry, government, and education to examine intensively the major issues and concerns in the areas of vocational and technical education. Emphasis was placed on the evolution of vocational education and on the present-day conditions that demand a refocusing of energies in developing new curricula and philosophies of instruction.

The dialogue concentrated on the implications of old and new vocational programs in the secondary schools, community and junior colleges, and universities; in addition, valuable insights were developed to assist in the reactivation of a graduate department at Teachers College.

The Conference was funded by the U.S. Office of Education, Division of Vocational and Occupation Research. Initiated by Dean Robert J. Schaefer, the following served as conference planners: Prof. Erling Hunt and Prof. Donald Super (co-chairman), Prof. Michael Brick, Prof. Mortimer Kreuter, and Prof. Jerry Rosenberg.

The papers presented in this volume seek to identify major issues in vocational and technical education and the demands made on educational institutions to heed the needs of the present and future world of work.

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Opening Remarks

There is a growing concern in Teachers College about our response to one of the great challenges of this period: how people might most fittingly be prepared as producers, managers, and workers to carry their share in the economic life of the world. We who work in the College and similar institutions are neither doing as much as we should nor performing even that part as well as we should.

The challenge can be described in several different ways. We can see it in the fact that almost all occupations now call for higher, more sophisticated forms of intellectual effort than similar work did a generation ago. The forms of work change so rapidly that people must now be prepared for occupational specialties that were unknown, not only to their parents, but to their elder brothers.

To put the challenge another way, since the rapidity of change in job requirements and employment patterns now suggests that the most essential of all work skills is the ability to learn, we must ask whether we are giving the attention we should to the development of that ability as an object of particular study.

Or we may ask what the school's responsibility is when unemployment of the uneducated appears to be accepted as a chronic condition of the economy. Although it is not the function of the school to correct everything that is wrong in society, the school must face the facts of the social order and meet the needs for knowledge and skill that society imposes on its members. Because we are responsible for the study of educational processes and institutions and for the preparation of teachers and other leaders, we have before us important unfinished business.

Work must go forward on at least three fronts. In the first place, more attention should be devoted to the educational implications of technology, and it should be centered particularly, although not exclusively, on those young people who fall in the lower half of the distribution of talent and scholastic aptitude as we now gauge those qualities. This is not to argue that we should ignore the problems of education and training for the upper half, but rather to note that schools and teachers have had thousands of years more experience in dealing with the academically apt and the scholastically oriented than in teaching those who have yet to learn the value of learning.

There is a second area in which work is waiting to be done. Once reasonably reliable clues have been found as to the nature of the skills and knowledge that will best fit the predictable requirements of the economy, we must undertake to develop the teaching techniques and curricular designs to enable pupils to learn the knowledge and to acquire the skills. It will not be enough simply to ask what technology demands and to seek techniques for responding to those demands. It is also necessary to look to the nature of the institutions in which these responses are to be developed and made effective. It is at least an open question whether our educational institutions as they are now designed and operated are equal to the tasks that are being laid upon them. Strengths and weaknesses will have to be assessed realistically, and policy, structure, and programs will have to be reconstructed to meet current and future conditions.

It will clearly be necessary, in the third place, to mount substantial efforts in research, development, and instruction as these bear on vocational and technical education and to explore the relationships between general education and specialized vocational or technical learning. Some of our basic assumptions about the nature of vocational education will probably have to be altered. We shall have to be prepared to revise our thinking about salable skills. As we face the problem of helping people to be adaptable throughout their entire lives, we shall have to investigate further the special problems of adult education. Such study will involve the emotional as well as intellectual aspects of employment, for a number of clues already evident suggest that the failure of some older workers may be due at least as much to emotional difficulties as to intellectual shortcomings.

What we need most at this time is a sharpening of the questions to be dealt with. Almost inevitably we shall learn something about the directions in which answers may lie, and no one here will want to reject such leads, for we need answers as well as questions. But most of all, we need the questions. We shall be able to count this conference successful if it yields sharpened queries, more clearly put issues, and suggestions about the next steps that might be taken to deal with the critically important and irresistibly urgent matters that bring us together.

Carl J. Schaefer

What Is Vocational and Technical Education?

There exists at present a state of uncertainty, fluctuating thinking, and outright confusion relative to vocational and technical education that needs to be clarified in the minds of educators and of their colleagues in other disciplines. Therefore, this chapter will begin with a review of the past and the present of vocational and technical education.

The Vocational Education Act of 1963, with its millions of dollars for the "new look" in education for the world of work, calls for a review of the passage of earlier legislation known as the Smith-Hughes Act of 1917.

The Smith-Hughes Act was long in its making. There are at least three dates that may be said to mark the beginnings of vocational education in the United States. The earliest is 1862, when President Lincoln signed the First Morrill Act.

This Act made possible the establishment of the state colleges of agriculture and mechanic arts. These colleges, known as land-grant colleges, were, from their beginning, professional schools of agriculture and engineering. They have profoundly affected vocational education on the college level and must at least be mentioned in any discussion of vocational education in the United States.

The second date of significance is 1876, the year of the Centennial Exposition in Philadelphia, where an exhibit featuring the results of a trade-education program that had been developed by Victor della Vos, the director of the Imperial Technical Railway School at Moscow, was shown. The program was based on a careful analysis of the elements of the trade to be taught, the ordering of these elements from the simple to the complex, the use of a craftsman as a teacher to provide group instruction, and the incorporation of a facility or shop as part of the formal school environment. This approach to trade education contrasted sharply with the individualized, sometimes haphazard, instruction provided the apprentice by his master in those early days.

Such a method of providing skill was just what the early vocational educators had been searching for. Apprenticeship was gradually disappearing as a means of training new workers, the Industrial Revolution was demanding skilled employees, and the analytical method of analysis of della Vos seemed precisely what was needed. As a result, new trade schools began to emerge, all claiming the use of the della Vos vocational system. It was not long, however, before the strictly utilitarian (vocational) concept of the movement began to find its way into the public school programs but in a more general education form called "manual training." Manual training became, in time, manual arts, and its current successor, "industrial arts," lays claim to its contribution to the general education of both boys and girls. The della Vos philosophy exists today in the minds of most vocational educators, and state plans for providing vocational education adhere to standards requiring that classes be taught by masters of their trade and that a curriculum be based on a trade or occupational analysis. Moreover, the shop or laboratory must, in most cases, duplicate the types and sizes of equipment found in modern industry.

The third date to be remembered cannot be divulged without first mentioning a small group of educators and laymen who, just after the turn of the century, banded together to form the National Society for the Promotion of Industrial Education. The specific purpose of this organization was to draw attention to industrial education (today, trade and industrial and technical). They expressed it as follows:

> The need for industrial education in the United States has become a social and industrial question of the first magnitude. It is not only a question that critically affects our material prosperity as a nation but one that vitally concerns the well-being of society as a whole.[1]

This small group so influenced public opinion that in 1914 the United States Congress appointed a special committee to report on the need for federal aid to vocational education. The report of the committee represented a zealous piece of work and presented many data. It is interesting to note that the report went into some detail concerning the waste of human resources. It suggested that the nation cannot tolerate the waste of (1) the involuntary idle, (2) the imperfectly employed, and (3) the improperly employed. The discussion concerning the aspirations of young people emphasized that many are denied an education other than for college preparation. Relative to the emphasis placed mainly on those going on to college, the report states:

> The rest leave school with inadequate general education and with no special training to fit them for work. Vocational courses are therefore needed to attract and hold in school pupils who now leave because they are unable to obtain suitable preparation for useful employment.[2]

On February 23, 1917, President Wilson reported to the Senate that he had signed S. 703, which was to be known as the Smith-Hughes Act. The year 1917 thus becomes the third important date to remember in the historical development of vocational education.

It should be remembered that the framework of the Smith-Hughes Act with its local, state, and federal relationship can adapt quickly to the needs of people and the requirements of the nation. The National Defense Training Program of World War II operated within the framework of the Smith-Hughes Act to turn out defense workers by the thousands.[3]

DEFINITIONS

Vocational and technical education are terms[4] that need clarity and image. Frequently, one can assume as many different connotations of these terms as there are individuals present. But, to the educator the semantics of the terms are as follows:

Vocational Education. Vocational education is as old as man himself. Man from the earliest days practiced a vocation for his own survival. He hunted, caught fish, dug the ground for roots, and so forth. He did these things to live, and a vocation is what a person does to gain a living. Survival for his offspring required that he teach his sons and daughters to perform those tasks necessary to provide food, clothing, and shelter; such teaching was the earliest form of vocational education.[5]

The definition used in this chapter, however, conveys the notion that vocational education is given in schools or classes under public supervision and control, and that it includes the areas of trade and industrial education, home economics education, distribution education, agricultural education, and, now, under the Vocational Education Act of 1963, business education. Each of these areas must meet specific state criteria to be approved by the State Board of Education. Their aggregate constitutes a complete program of vocational education. Individually, each constitutes but one phase of the vocational program.

The U.S. Office of Education, in Pamphlet No. 117, emphasizes that the controlling purpose of vocational education is to fit persons for useful employment:

> Vocational education helps to give definite purpose and meaning to education by relating training to specific occupational goals. It is more inclusive than training for job skills. It also develops abilities, understandings, attitudes, work habits, and appreciations which contribute to a satisfying and productive life.[6]

It should be made very clear that vocational education does not take the place of general or academic education. Vocational education supplements and enhances general education for those who want training for a chosen occupation. It is part of a well-rounded program of education aimed at developing citizens who are competent economically, socially, emotionally, physically, intellectually, and civically.

Dr. James B. Conant pointed out the importance of vocational education as part of a well-rounded educational program when he addressed the National School Board Association at their Eighteenth Annual Convention in Miami, Florida:

> . . . the academic talented pupils constitute not more than 20 per cent and often not more than 15 per cent of the student body in the type of school I am discussing. What about the courses that ought to be elected by the other 85 per cent or so of the student body? To answer the question in a few words and to over-simplify a complex issue, I would say that the other pupils should elect a consistent program directed towards the development of a specialized talent or a vocation.[7]

Technical Education. The term "technical education" carries the connotation of specific knowledge and understanding of the theory or "know-how" as compared to manipulative skill. The definitions-of-terms bulletin of the American Vocational Association defines technical education to be:

> . . . education to earn a living in an occupation in which success is dependent largely upon technical informa-

> tion and understanding of the laws of science and technology as applied to modern designs, production and service.[8]

From this definition, it can readily be seen that technical education has no particular bounds and that all vocational education (trade and industrial education, distributive, home economics, business, agriculture, and even professional) encompasses technical education. Technical education must therefore be defined in terms of the job or occupation. Normally, a person who performs a highly technical job is classified by payroll title as a technician in contrast to a craftsman or tradesman. The technician, then, is a

> . . . worker on a level between the skilled tradesman and the professional scientist or engineer. His technical knowledge permits him to assume some duties formerly assigned to the graduate engineer or scientist. For example, technicians may design a mechanism, compute the cost, write the specifications, organize the production, and test the finished product. There are technicians in other occupational fields.[9]

The technician in the industrial field holds a key spot between the engineer and the craftsman in industry, between theory and production. He uses drawing instruments, gauges, applied science, mathematics, common sense, initiative, analysis, and diagnosis. He collects data, makes computations, performs laboratory tests, and turns in reports. He builds, supervises, trouble-shoots, and controls the machines in our plants and offices. He is classified as a semiprofessional, but, within this designation, there exist various levels of technical competency.

For example, some technical occupations are of very limited scope and level. In this group are such jobs as inspection, in which the work deals with a few specific instruments and scientific principles. In these jobs, the worker uses relatively little independent judgment and a low level of technical ability. Such jobs are often referred to as low-level technical jobs, and the training is usually carried on within the industrial plant.

Other technical occupations deal with a fairly narrow scope or range of content but require a high level of ability within the range or content; for example, the repair and servicing of television receivers. In this field, a technician needs to know a good deal about basic electronics, testing equipment, and the like, but the work is normally confined to television receivers. Such an occupation might be defined as technical specialist.

There are still other technicians whose jobs cover relatively wide activity and require a high level of technological knowledge. Such jobs as engineering aide, tool designer, instrument repairman, and electronics technician are in this category. Technicians in these fields require a broad education in science and mathematics, usually beyond the high school level. They act as assistant engineers and aides to scientists. They design parts for machines, control product quality, test experimental units, and make computations. They are prepared to handle a considerable range of tasks within their general fields.

Thus, technical education, as interpreted through the technician, has several facets.[10]

STATISTICS

In scope of occupations involved, vocational and technical education literally cover the complete gamut of activities by which men and women earn their daily bread.

A significant proportion of the 15- to 19-year-old age group is enrolled in school, and population data for this age range are available. When making comparison with the total population of youth 15 to 19 years of age, we find approximately 13.0 per cent of in-school youth in approved (Smith-Hughes and George Barden) vocational and technical education programs.[11] It is interesting to note that, generally speaking, the southern states, and especially Arkansas (29.8%), Georgia (27.3%), Mississippi (28.0%), and Tennessee (24.5%), have the largest percentage of 15- to 19-year-old enrollment in vocational and technical education.

Many of the largest states have the smallest in-school vocational and technical offerings—California (8.1%), New York (7.2%), Illinois (8.7%), Pennsylvania (6.1%), and New Jersey (2.8%).[12]

Therefore, the current picture, based on enrollment, isn't very bright. In fact, there is a drip where there should be a stream; it is insignificant to the total problem of providing anywhere near the proportion of trained manpower needed to meet today's technological demands. As Grant Venn, author of *Man, Education, and Work,* puts it, "... technology has created a new relationship between man, his education, and his work, in which education is placed squarely between man and his work."[13] An educational imbalance that concentrates on 20 per cent of students who will go to college leaves 80 per cent to be educated for the world of work.

IN PRACTICE

The 1963 Review of Activities in Federally Aided Programs of Vocational and Technical Education of the Division of Vocational Education fails to come to grips with the actual image of vocational and technical education in this country.[14] The picture painted is one of steady progress and of little concern. The facts cited previously speak otherwise.

The Manpower Report of the President is more realistic in its evaluation.[15] Vocational and technical education in the public schools suffers from a poor image. Drop-out rate is high. A National Education Association study found that at least half of the students entering vocational high schools dropped out before graduation. Project Talent indicates that the basic reason for this and other problems of vocational high school students is the "dumping" of students with records of low achievement into many vocational programs. All too often these students can barely read. Furthermore, the presence of many low achievers in standard vocational programs adversely affects the standing of these programs and their ability to attract better qualified young people with good mechanical aptitude who would benefit from this kind of education. The following five-point program is presented with a view toward achieving a betterment of vocational and technical education:

1. With the passage of the Vocational Education Act of 1963, vocational educators find themselves with a golden opportunity to structure their programs to do the job. As educators first, and teachers second, they have been plagued with trying to meet the needs of all youth, including a preponderance of those who are not academically talented. They could no more make a highly skilled mechanic out of much of the raw material sent them than one could make a silk purse out of a sow's ear. Their response to this problem has been one of lament and frustration. For, as educators, they subscribe to the philosophy that all the children of all the people need to be educated. But now the answer can be – in fact, must be – to elevate high school offerings for the high-skill occupations to a high level of quality in students, teachers, hardware, and curriculum to assure without a doubt the production of a superior product. Moreover, it may be decided that the job cannot be done at the secondary level, and more effort will be forced into a postsecondary offering. Regardless, the product must meet without qualification the requirements of a high-skill level, or the long-fought argument that vocational education is designed primarily to provide highly skilled manpower deserves to go down the drain.

Even more important, there now must be designed a program of semiskilled occupational training to syphon off those youths who do not have the endowment or motivation to achieve in the highly skilled occupations. Such a program should take care of the bulk of students who in many schools take the so-called general curriculum, which is pointed toward nothing. Moreover, here is where the drop-out rate is the highest.

2. What about the student selection process? Why don't

students know more about jobs and occupational opportunities, even in the elementary and junior high schools? Why isn't a unit in occupations included as part of social studies or industrial arts, and why must the emphasis of guidance be on the academic student? Few would disagree that guidance as now conceived is a very weak link in the educational chain. Part of the challenge lies here and the time to do something about it is now. One solution is an out-and-out marriage between vocational education and the State Employment Services. These services have long wanted to play a greater role in the placement of vocational graduates, and there would seem to be no reason why they shouldn't become an integrated part of a secondary school vocational guidance offering, even to being stationed on school premises. They may be able to achieve where teachers have failed.

3. Vocational educators have been so intrigued with their ability to teach skills (and there's no question but that they can and must continue to teach skill) that they have forgotten that the whole youth needs to be educated to the task of becoming a successful worker. Retraining programs (MDTA and ARA) have proved time and time again that the acquisition of skill helps only to get a job and does not assure holding it. Employment training must use a team approach that goes far beyond the teaching of mere skill. The concept of related instruction stops way short when only related theory is considered. Why hasn't team teaching been used to a greater extent, a technique by which the shop, related subjects, and social studies teachers operate on a *clinical basis* to attack the problem of the total development of the individual student? Obviously this would take a different organizational pattern, but the results might be surprising.

4. Teachers must be kept up-to-date in their field. This involves more than their getting a job during the summer months. Often this is a monetary necessity and not a learning experience. What is involved is their up-to-dateness in technology and in pedagogy. More emphasis needs to be placed on technology in teacher-education programs. Furthermore, plans must be formulated to get teachers back into the main-

stream of the changes in their occupation. Why can't vocational funds be used to extend the length of the school year by one month to provide for a plan of teacher up-dating? Why can't a three-year plan be devised in which during one year the teacher goes back to school for a month, the next enters a planned program in industry, and the third remains at school to make adjustments in his physical facility, or course of study? Up-dating is a respectable expenditure in industry, but it seems in education that the holding of a permanent certificate is the apex of teacher advancement.

5. Measures of quality control must be found. No private enterprise will stay in business very long without having a quality product. What is known about the vocational-education product? It is true that many get jobs and random successes are scored. But what about the masses? Accreditation is a possible solution. The license for practical nursing raised the quality of programs in short order. Quality control through achievement and proficiency tests has merit well beyond mere class ranking of students. Ohio has made use of achievement tests to improve student selection, courses of study, instructional materials, physical facilities and hardware, as well as teaching. If teachers had to display the quality of their product as the football coach does every week, some changes would surely be made.

In conclusion, there is no question but that the force behind vocational and technical education is technology. But behind technology stand men, men with the power to dream, to design, to create, and to build. Men of mind and men of action have hewn the society of today's world. A contributing force yet to be fully realized, but which brings together human experience, human initiative, imagination, and daring and harnesses them together to meet the needs of the mind, the heart, and the hand, has been called "vocational education," preparation for the world of work.[16]

Notes

[1] National Society for the Promotion of Industrial Education, "Printed Announcement, Constitution," *Minutes,* November 1906 (available in Office of American Vocational Association, Washington, D.C.).

[2] U.S. House of Representatives, *Vocational Education,* House Report No. 181 (Washington, D.C.: Government Printing Office, February 12, 1916), p. 1.

[3] Office of Education, *Education for a Changing World of Work,* Report of the Panel of Consultants on Vocational Education, OE-80021 (Washington, D.C.: U.S. Department of Health, Education, and Welfare, 1963), p. 103.

[4] The term "vocational and technical" is usually used in a singular sense when spoken of in the profession. In defining its component parts, it is necessary to use the plural verb *are.*

[5] Office of Education, *Education for a Changing World of Work,* p. 18.

[6] Office of Education, *Public Vocational Education Programs,* Pamphlet 117 (Washington, D.C.: U.S. Department of Health, Education, and Welfare, 1957), p. 1.

[7] James B. Conant, *Some Problems of the American High School,* address before the National School Board Association, 18th Annual Convention, Miami, Florida, July 15, 1958.

[8] American Vocational Association, *Definitions of Terms in Vocational, Technical, and Practical Arts Education* (Washington, D.C.: American Technical Association, 1964), p. 20.

[9] *Loc. cit.*

[10] Lynn A. Emerson, *Vocational-Technical Education for American Industry,* Circular No. 530 (Washington, D.C.: U.S. Department of Health, Education, and Welfare, Office of Education, 1958), p. 3.

[11] Office of Education, *Education for a Changing World of Work,* p. 75.

[12] *Ibid.,* pp. 75–77.

[13] Grant Venn, *Man, Education, and Work* (Washington, D.C.: American Council on Education, 1964), p. 1.

[14] Office of Education, *A Review of Activities in Federally Aided*

Programs of Vocational and Technical Education, OE-8000S (Washington, D.C.: U.S. Department of Health, Education, and Welfare, 1964).

[15] U.S. Department of Labor, *Manpower Report of the President* (Washington, D.C.: Government Printing Office, 1965), p. 104.

[16] Adapted from a speech by C. Thomas Olivo before the Instructional Materials Conference in Washington, D.C., 1959.

Eli Ginzberg and Dale L. Hiestand

Key Issues and Problems in Vocational and Technical Education

The problems and issues in vocational and technical education are not unique. They have their counterpart in all education that is occupationally oriented. Whether it is education of future semiskilled workers, skilled workers, technicians, or professional workers, certain problems appear and reappear. For this reason, most of the following discussion has been cast in relatively general terms. In addition, general discussion will encourage a more careful examination of the issues involved instead of merely deferring to existing customs. In passing the Vocational Education Act of 1963, the Congress implicitly or explicitly took a policy position on many of the questions this chapter will raise. In a democracy, of course, such a political decision does not close the debate; in fact, subsequent experience under new legislation may turn out to be somewhat different from anticipations.

The new legislation provides in a general way for all occupational training except that which is considered professional or requires a baccalaureate degree. In a very real sense, therefore, Congress has left the resolution of important questions to administrative leaders in the U.S. Office of Education, the state departments of education, and other state and local educational officials. Where heretofore these questions were largely academic because the decisions had been implicitly made and were embodied in legislation, the questions are now open again. As a result, the questions have become very real and will be explored at every level of educational administration. Moreover, it is likely that different decisions will emerge in different jurisdictions and in different occupational fields.

The questions to be considered here fall into several general areas:

1. General purpose of occupational education
2. Occupational education in relation to general education
3. The flow of students into and out of the occupational program
4. The determination of program needs, curriculum, etc.
5. The teaching personnel
6. The administration and financing of programs
7. Research needs

There are may interconnections between the various areas, as will become clear.

The first set of questions, the general purpose of occupational education, brings forth many answers. One point of view holds that occupational education is essentially exploratory in nature, designed primarily to permit a person to learn the nature of a particular kind of work and his aptitude and interest in it. At the other extreme is the position that the function of occupational education is to equip the individual fully to perform effectively in some specialized occupation. Between are several other positions. Some hold that occupational education is to prepare a person to enter an occupation; he will then learn the necessary skills on the job. Others believe that occupational education should be a supplement to on-the-job training. These contentions revolve around one central question: Which occupational skills should be developed in schools and which should be employment-based?

Educators often contend that occupational education should be education, not training. Training should refer to the learning of skills with meaning only for employment, whereas occupational education should have a somewhat broader function. This brings us to the perennial question of the relationship that should exist between general and occupational education and, within occupational education, between the learning of specific skills and general preparation for subsequent employment.

Another question emerges from this. How long should an occupational training program be? Because of the necessary admixture of general education within the program, as well as time lost through school holidays and vacations, there is serious doubt whether a school should attempt an occupational program of less than one year. This minimum is roughly equivalent to three to five months of on-the-job training. At the other extreme, once young people tire of general education and develop a specific occupational orientation, it may be difficult to keep them in school for more than two or three years. Once the idea of occupation and employment crystallizes, anything less than an actual job begins to pall on most young people.

The next set of questions has to do with who should enter these programs and how their entry should be determined. What should be the nature of guidance and selection processes? Some programs have tended to select only the highly qualified. One can raise the question of whether these students should rather be encouraged to go on to the next higher level. For instance, a youngster who is highly qualified for a high school drafting program might better be encouraged to delay his occupational preparation until junior college, where he might enter an engineering-technician program. Similarly, a highly qualified youngster who is much better than the average in an engineering-technician program might be encouraged to enter a four- or five-year engineering program instead.

Other problems emerge if the standards of admission to a particular program are low. Many youngsters may fail in the program or do poorly on the job. This raises the charge that educational resources are being wasted. Indeed, a significant number of poorly qualified youngsters in any program may create a bad reputation for the program and thus harm the employment prospects of those who do well. However, when admission standards are low, many youngsters are offered an opportunity for a significant improvement in their occupational status which otherwise would be denied them.

The determination of the point at which students leave the general educational stream for specific occupational education raises other questions. For instance, how will occupational programs be housed and located in relationship to other educational programs? In particular, to what extent should students be confined within a program or, alternatively, educated along with students in other programs? What should be public policy with respect to providing separate vocational secondary schools as against so-called comprehensive high schools?

Some related questions must be answered for each program. What are the opportunities for students to move into or out of a program before or after passing the conventional crossover points? If students enter a program later than usual, how can their losses in terms of time, credits, and the like be minimized?

Most of the discussion so far has been cast in terms of youngsters who follow a "normal" progression through the general educational stream and into a terminal occupational program. The major part of vocational education is, and increasingly will be, concerned with quite different groups. What principles will guide the establishment of programs for those who are already employed, for those who dropped out of the general stream prematurely, and for those who are trying to acquire the skills necessary for re-employment? Can any general principles be laid down, or will administrators make decisions depending on the resources available to them and the pressures upon them? If resources of time, teaching manpower, facilities, and the like are limited, on what basis should priorities be established?

Other equally pressing problems have to do with the determination of the occupations for which programs will be established in a particular community, the content of the curriculum, and similar problems. The Congress has decreed that state and local vocational education programs and services must be subject to "periodic evaluations . . . in light of information regarding current and projected manpower needs and job opportunities." This raises the question of the extent to which occupational education programs should be based on the labor market, employers' needs, and the like. Will programs, to the extent that they are oriented to employers' needs, be influenced by the size of the employers and their ability to fulfill their own training needs? On the other hand, to what extent should programs be directed to the students' or trainees' needs and attempt to teach skills that will open up opportunities not available to them in the ordinary course of events? This question is particularly crucial for the hard-to-educate, the handicapped, Negroes and other minorities, and girls and women.

It is interesting to note that the Vocational Education Act of 1963 goes to great length in specifying semiskilled, skilled, technician, business, and office occupations. It makes no explicit reference to service occupations, although nearly two out of three persons employed today are in the service sector. It should be noted, moreover, that the service sector consists of an admixture of profit enterprises, nonprofit enterprises, and governments. How can occupational education programs be made truly responsive to these facts and to such other trends as appear in the future?

On the other hand, how will programs in areas of declining employment be handled? What needs for training exist in declining employment fields?

These questions can be recast in terms of the criteria by which various occupational education programs can be assessed. If a high proportion of graduates enters the occupation for which they are trained or a closely related occupation, can this be considered a criterion of a successful program? Will the program be considered successful if it merely increases the general employability of students? If a significant number of graduates go on to the next higher level of education, will this be considered successful or unsuccessful education? Or poor pupil selection? Is it a successful educational experience if as a result of a program students decide that they do not want to enter a particular occupational field?

The fact that most occupations short of the professional level can be entered through a variety of educational and training programs, and often on the basis of on-the-job experience without any formal training, suggests questions of educational organization and administration, as well as of student guidance and placement. The relationship between "normal" student programs, initial entry programs for adults, and retraining programs for adults has already been raised. But often programs preparing people for the same occupation may be offered at different educational levels. How, then, will occupational education programs in secondary schools, such as for technicians, be dovetailed to similar opportunities in junior colleges or technical institutes? How can occupational programs in schools and colleges be better coordinated with training efforts in the armed forces, industry apprenticeships, and other employer programs? Is it desirable to seek to minimize or to maintain duplication in the community? If there are plural routes into occupations, how can it be assured that those who start on one route will receive credit or recognition when they transfer to another route, that is, when they enter a new program or take a job in the field?

The problem grows more complicated with the passage of time as alternative training programs appear. The newest arrivals are the special programs under the Manpower Development and Training Act and the Economic Opportunity Act. How will new training opportunities and programs be related and ultimately adjusted or rationalized into a workable system?

The content of the programs presents a continuing problem. How will the curriculum in particular occupational fields and institutions be determined? What is the role of the faculty and of the administrators? What role will employers play in the determination of programs to be offered, facilities, curriculum, content, and the like? What is the role of the public and its representatives? To what extent will the curriculum content be influenced by legislated or mandated standards in the occupational field as a whole or in certain parts of it?

The area of teaching personnel for occupational programs raises a series of quite different questions. The need for instructors to be occupationally competent presents a recurrent problem. Teaching personnel capable of conveying the specifics of an occupation can often obtain higher salaries working in the occupation rather than in teaching. How will the educational system obtain the teachers it needs when it is in competition with the employers who want more trained students? What should be the balance among the teaching personnel, both as a faculty for a school and as individuals, between familiarity with the specifics of occupational performance and a more generalized approach to the requirements for successful performance? How are teaching personnel to keep themselves informed of ongoing changes in their respective fields?

More generally, what principles should guide the selection, education and training, and upgrading of teachers in occupational education programs? Are the principles the same or different from programs in different institutions, for different occupations, or for different kinds of students?

One question has to do with the retention, transfer, or retraining of teachers in occupational fields that should be phased out. This problem will become more pressing if closer attention is paid to the labor market in continuing programs. It may also be particularly troublesome for area and other cooperative efforts. In a joint venture, what is the responsibility of the separate school systems for the tenure of teachers?

One major problem is presented by the fact that occupational education programs tend to be relatively expensive. How will the costs of such programs be assessed and allocated? What costs can be absorbed, and when are costs so prohibitive as to make occupational education not feasible? In particular, to what extent will expensive machinery, equipment, auxiliary workers, and the like be provided in an attempt to offer "realistic" training experiences? How will this expensive equipment be kept up to date?

Occupational education programs, with their high overhead costs, can be run more easily when there are many students and the per student cost is low. But what is to be done when a particular community or institution does not draw from a large enough population? Should high school and junior college students be trained in the same institution or program? What conditions should determine the size and location or efforts within different-sized communities? Under what conditions and in what way should programs be set up to cut across conventional political boundaries of school district, township, or county? Are there any needs for cooperative programs among states? What principles should guide the provision of occupational education opportunities for students in parochial schools?

A series of questions at a different level is now confronted. In view of the increased freedom and resources available to occupational education, new challenges are presented to administrators of vocational and technical education, new and larger responsibilities devolve upon the institutions and faculties involved in the education of educators for both vocational and other programs, and new and enlarged research efforts are all the more necessary.

It might be asked whether those who have been involved in the administration of vocational education are adequately equipped to handle the new responsibilities that have devolved upon them. For decades, vocational education has been a kind of stepchild, a field many prospective educational leaders have tended to avoid. Moreover, the legislative straitjacket within which vocational education has operated has tended to encourage those with bureaucratic rather than innovative tendencies. Superintendents of systems, principals of comprehensive schools, and others concerned with central educational administration tend to have had limited contact with or understanding of vocational education. Finally, those in vocational education have tended to "play it safe" politically for a variety of reasons, including the specialized nature of their support in the community, the not-so-subtle implication that the programs are for those from a particular class or social status, and the possibility of involvement in matters of labor-management relations.

There may well be strenuous objections to the above characterizations. In the last decade, vocational and technical education has shown considerable dynamism. The technical institute and junior college sector have been rapidly growing as technician training has developed rapidly. New programs have been established in practical nursing and other health occupations. The concept of area education programs and new devices for interdistrict cooperation have been developed.

Various suggestions have been made for the improvement of leadership in occupational education. Some have pointed to the need to keep alert for potential leaders in teaching staffs who can be developed. Others have called for a greater awareness of vocational education in all undergraduate and graduate programs for teachers and educational administrators. Whatever else is needed will have to await a fuller identification of the problem and its exploration by the institutions of higher education and their teaching and research staffs.

Institutions involved in the education of teachers and administrators have a great deal of work before them in the area of curriculum studies. In particular, they need to carry on a continuing critical review of the relevance of what is being taught and how it is being taught, together with a search for what should be but is not being taught and an experimentation with new approaches. There is a need for explorations of the extent to which there are common foundations to various fields, which would permit programs to be offered when enrollments in particular fields are inadequate. There is much room for curriculum experimentation with varying proportions of theoretical and applied knowledge in different fields. Finally, experimentation is needed in the development of curricula for persons with different backgrounds, ranging from programs for the hard-to-educate or hard-to-employ to those who have had varying types and degrees of employment experience.

A considerable amount of research related to guidance and counseling seems necessary. We know too little about how young people develop interest in the occupations at less than the professional level. Studies showing the ways in which aptitudes and capacities develop and differ at various age levels—in late puberty, adolescence, and early maturity—might provide better guides to how general or highly differentiated curricula should be. There is need for research into ways of better coordinating guidance with respect to general and occupational program choices and with respect to later educational and occupational options and needs. Controlled studies are needed of the extent to which work-study and other approaches might in fact be useful in the developmental experiences of different groups of students, including the able, the average, and the hard-to-educate. There is a particular need for experiments in the use of varying testing, guidance, and administrative procedures to assure that young people have adequate opportunities to change their educational track.

Finally, there are several general research areas that have not yet been adequately studied. On-the-job training needs to be studied with a view to its implications for occupational education programs, both in terms of methods and in terms of better dovetailing of training and educational programs. The rapidly expanding programs for special youth and adult training should be carefully examined with the same ends in mind. Considerably more needs to be done in the area of critical studies of foreign programs. Finally, careful longitudinal studies are needed involving the selection, development, and occupational experience of different groups of students in occupational education and other programs.

In conclusion, it may be well to re-emphasize two crucial characteristics of occupational education that are often overlooked. The programs organized and the questions debated depend on conceptions of what occupational education should be, and any confusions in assumptions will inevitably become magnified through the actions taken.

The first point to re-emphasize is that occupational education is primarily involved in helping adults, not children. Occupational students have a fairly specific idea of how they will fit into the world of work. Night school programs have always been more significant than day school classes in the high school trades and industry and the distributive education programs. At least one-third of the students in the vocational-agricultural and the newer health occupations programs are in night school. For all practical purposes, the students in the most rapidly growing sector of vocational education—the junior colleges and technical institutes—are adults. Retraining has not yet emerged as a significant problem for technicians. This reflects the fact that these are new fields that have been filled by young people. In the years ahead, the technical institutes will undoubtedly be dealing more and more with retraining of adults.

Despite the heavy and increasing involvement of vocational training with adults, most discussions of occupational education continue to center on youths. What kind of programs would emerge if the training of adults were recognized as the central function of occupational education?

The second key characteristic of occupational education is that it cannot escape being closely tied to the labor market and the economy. Occupational education is inevitably a service operation, providing persons with skills that they and their potential employers will find valuable. The demand for these skills may grow or decline as the economy and technology change. Inevitably occupational education programs have large investments in equipment and specialized teaching personnel. Administrators are faced with crucial questions when such large investments are made. Is the need for workers in a given occupational specialty large enough and permanent enough to warrant this investment? How can the organization, its capital equipment, and its teaching personnel be kept abreast of changing needs? The problems faced and the risks taken are quite akin to those of industrial organizations. Occupational education programs inevitably and properly assume a pragmatic character responding to different needs in different communities in different ways.

The wide range of questions raised above represents a large order in terms of policy, research, and informational needs. The ongoing rapid increases in the scale and range of occupational education programs make answers to these questions all the more necessary. Decisions made in the next few years will provide the precedents for the decades ahead, and mistakes made now and embodied in programs will be hard to undo. Careful delineation of the problems and clearer directions for the future will be of inestimable value to educators, administrators, the public, and—most important of all—the adults and young people who will in the future enter vocational and technical education programs.

Donald E. Super

The Vocational Education of the Semiskilled

Not long ago a meeting was held to discuss "A New Look at Vocational Education." The meeting was attended by key people in two of the best-known vocational schools in that part of the country, who served as speakers and as resource people, and by representatives of a number of Boards of Education, both laymen and professionals. The meeting was dominated by two related notes: (1) the desire of the vocational education establishment to control all types of education that might be vocational, including a proposed county college; and (2) the belief that the new look in vocational education consists of more and more of the same. If these men were, as indeed they are, the current local and regional leaders in vocational education, vocational education in the area in question is, in this period of rapid change, going rapidly nowhere.

It is not that the quality of what is static is *ipso facto* bad. The vocational education programs represented by these men are, judging by all the evidence on what they are doing, excellent. What they will do with more money and more public support will also be excellent. What should bother all thinking people is what they are not doing. They are so convinced of the soundness of their basic assumptions, of the wisdom of their approach, and of the unwarranted bias of any and all critics, that they fail to heed the signs of the times.

Vocational education today faces three great challenges, only one of which is recognized by established vocational education, only two of which are recognized by the Vocational Education Act of 1963, and the third of which is recognized only by some manpower specialists and critics of the social scene. This chapter will comment very briefly on these three challenges, and then deal in detail with the last two.

SKILLED AND TECHNICAL OCCUPATIONS

The first of these problems, that of the increasing demand for increasingly highly trained skilled and technical workers, must be noted in passing. The fact that there are demands for highly trained workers below the professional level does a great deal to justify the traditional stance of vocational education and to keep the middle-class bias in vocational education. By middle-class bias is meant the view of an occupation as a life work, something which one chooses because of capacity and interest, which one pursues avidly and persistently, and by means of which one earns a living throughout one's adult life. In the case of the printer and the plumber, and, presumably, in the case of the electronics technician and the computer programmer, the trade one learns becomes the trade one pursues for years to come, perhaps with some special training as new methods and materials are developed. It is in this way that the middle-class bias, the emphasis on stability and commitment, manifests itself.

This bias is fine, for those who have the capacity, the interest, the commitment, and the opportunity to pursue one occupation. But it leaves out of consideration the large number of young people and adults who do not have the characteristics assumed to be present by the traditional approach to vocational education. It is much easier to identify skilled occupations, whether blue collar or white collar, for which a clear-cut kind of training is needed, and to prepare and offer a curriculum for them, than it is to ascertain the objectives, content, and methods of training the semiskilled. It is, therefore, only natural for vocational educators to have chosen, and to continue to want to choose, to concentrate on the skilled. Natural, but not appropriate.

THE SEMISKILLED

Career Patterns

The semiskilled worker of the past and of the present has been shown, in a number of different studies, to be much more likely to have an unstable or multiple-trial career than a worker in higher-level occupations, and he is much less likely to have a stable or conventional career.[1] The semiskilled change jobs and occupations much more often than do the skilled, the clerical and sales, the executive, and the professional workers. The higher one goes on the socioeconomic scale, the more stable or conventional the work history. This means that the individual is more likely to prepare for, enter, and advance in one field of work (the stable career typical of physicians) or to try one or more occupations and then settle down in a regular adult occupation (the conventional career typical of executives). The lower the individual on the occupational ladder, the more likely he is to move around horizontally without ever climbing the ladder. The jobs that he gets and holds are often unrelated to the jobs he has held, and he tends not to hold them long. This was true in the 1920's, the period covered by Davidson and Anderson;[2] in the 1930's, the period covered by Miller and Form;[3] and it is true today as shown by the Department of Labor[4] and by my own career pattern study.[5]

Of course, some semiskilled workers stay on one job, as gas station attendant, textile mill worker, or auto assembly man, for many years, but these appear to constitute a minority.

Vocational Education for Occupation or for Career?

These facts, whether clearly or dimly perceived, are an apparent justification for not actually including most semiskilled occupations in the program of vocational education, even though these occupations are included among those for which training may be provided. When the demand for training for a particular semiskilled field, such as practical nursing and nurse's aides, is clear, the training is provided. But the focus is always on the *occupation*, rather than on the person who will fill it, even though it is a person who is being trained. Thus, thousands of power sewing machine operators are trained who work at the job for a short time only, creating vacancies for which more transient employees are to be trained. No one seems to ask what happens to the ex-operator, to what other occupations, if any, she shifts, how she makes these changes, and how well-prepared she is to make them. It seems not to have occurred to leaders in vocational education that, for the frequently changing semiskilled worker, education for a career of changing jobs may itself constitute the most appropriate kind of vocational education.

The blindness of vocational educators to the needs of the semiskilled worker has, of course, been the result of the nature of the legislation providing financial support. The training provided must be for an identifiable occupation, one for which workers are needed and for which a training program can be devised. This is fine for the occupations that contain some challenge, provide some status, are reasonably free of seasonal and cyclical variations in employment, and pay moderately well. In such instances, training is for stable employment. But when the occupation lacks one or more of these characteristics there is no such stability. If the training to be provided had as its objective making the individual *employable* throughout a significant part of his career, the training would not necessarily have to be *occupational*. It could include other kinds of content needed for employability and content relevant to a number of semiskilled occupations in any one or combination of which the person might be employed during the succeeding years.

Another way of putting this is to say that vocational education should not be exclusively education for *occupations;* it should also be education for *careers*. It could then prepare not only for stable careers, as it now does, but also for unstable and multiple-trial careers, for the sequence of unrelated positions that many people occupy during the course of their working lives.

THE ELIMINATION OF SEMISKILLED JOBS

The semiskilled worker of today is not only a person whose career is neglected by vocational education; he is one whose career is threatened by occupational trends. It has frequently been pointed out by manpower specialists that the increasing automation of industry and business dispenses first with the semiskilled worker. Some of these may find their way into skilled occupations, upgraded by salvage and retrieval activities such as those of the Manpower Development and Training Act and of company programs designed to prepare workers about to be displaced for the more demanding positions made available by the newer methods and equipment. But many seem destined to find their way only into the ranks of the unemployed.

The new semiskilled occupations to which people point as possible outlets for the displaced semiskilled who are not upgraded into skilled and technical occupations are in the service fields. To some extent, these will undoubtedly absorb the potential semiskilled workers of the future. These young people will learn to manicure lawns and gardens, to carve mantelpieces and do custom millwork for people who do not want to buy one of the three stock mantels or prefabricated paneling, and to repair radios and television sets that owners don't want to scrap in the mass production style of today. They are already learning to repair cars in greater numbers than ever, as multiple-car-owning families increase and fail to see why they should have to turn in both cars every year or even every three years. But it does not seem likely that these and other service occupations, many of which are being automated also, will increase sufficiently in numbers to provide employment for all of the displaced. What will the others do, and how will they be educated to do it?

Many observers of the contemporary scene predict a great increase in the amount and importance of leisure. The available work may be spread among more people by having them work shorter hours. Or some may do the needed work while others learn to enjoy an enforced leisure at public expense. In either case, learning how to use leisure, and how to derive from leisure activities the meaning to life that work has so far given most people, seems destined to assume greater importance than ever. Just as the sons of knights and lesser nobles were once apprenticed to greater nobles to learn, as pages and squires, the arts of leisure, so perhaps someday vocational education will be redefined to include education for the arts of leisure. Yes, it may be said, but not under the Vocational Education Act of 1963. Agreed. But then, it must be asked, is the vocational education program to be bound, in preparing leaders for the field of vocational education, by the Act of 1963, or even by a *possible* Act of 1973, in the same way in which the programs of the past generations have been bound by the Act of 1958 and by its predecessors since 1917? The answer is clear: If the vocational education of the next generation may, to be effective, need to include avocational education, then it is necessary to prepare leaders who have some vision of the possibilities in this area and who can move in this direction if the situation requires it. Today's leaders are largely unequipped to do this.

EDUCATION FOR CHANGE

Education for change implies the development of either or both of two different kinds of skills in the individual. One of these, perhaps the more common, denotes the training of the student in fields that are so basic that he can, with this background, learn whatever he needs to learn as he encounters new situations and meets new demands. This is what contemporary French educators mean when they write about *une éducation technique polyvalente.* It is a polyvalent technical education, which results in such a firm grounding in mathematics and physics or chemistry (or all three) that the product of the training can solve unfamiliar problems, develop new methods, and adapt to changing conditions, all with greater ease than if he were a narrowly trained technician. This is what Princeton, M.I.T., Columbia, and certain other institutions have been attempting to achieve in their basic engineering programs, avoiding specialization in mechanical, electrical, chemical, or other fields of engineering. The objective is a generic engineer, who can learn to function in any of these specialties, or who can achieve his own new synthesis and specialty if the field so requires.

This kind of versatility is not that which can be expected of the semiskilled worker. This kind of polyvalence involves a high level of ability to think in abstractions and to translate them into a variety of concrete forms. It requires, in other words, very superior intelligence. The typical semiskilled worker does not have that much academic ability. This kind of polyvalence is clearly not for him.

WHAT IS VERSATILITY?

A second kind of versatility is a combination of intellectual and personality factors. It is intellectual in that it involves enough knowledge and skill in the basic or tool subjects of English, mathematics, natural science, and social science so that new specific, lower-level knowledge and skills can be acquired, and new situations can be understood and adapted to readily. It involves personality in that such versatility requires a flexibility, an openness to change and to dealing with change, which is at least as important in the semiskilled worker as are knowledge and skill.

Some of the knowlege and skill components are already being sufficiently stressed by the advocates of excellence in education: the importance of communication and computational skills and of physics and chemistry are self-evident. Emphasis on the social sciences, as basic knowledge and skill subjects for semiskilled workers, may be made in a context different from that of the advocates of general education, but their arguments for appropriate work in the social sciences for all are particularly pertinent for semiskilled workers.

The pattern of unstable and multiple-trial careers, which is so common in that group, makes especially important an understanding of the economics, the sociology, and the psychology of industry and of work. For the semiskilled worker, dealing periodically with the need to change job, occupation, or enterprise, needs to know when to change, what to change to, and how to change. He needs to know how to find, and to use, whatever resources and data may be available to help him weigh such different variables as hourly wages, average hours worked per year, seasonality and seasonal alternatives, daily and weekly schedules, fringe benefits, management and supervision, associates, physical conditions of work, variety, freedom and pace of work, locality of employment, and inherent advantages or disadvantages of housing, schooling, recreation, and transportation. For him these variables are likely to be much more significant than the nature of the work itself, which may vary from time to time and from place to place. For him the social science of work will be much more important than the technical knowledge or skill of work, even though neither he nor the developers of the curricula of vocational education have generally conceived of these topics as vocational education. They are education for work and for careers, and hence they *are* vocational education.

VOCATIONAL SOCIAL SCIENCE

The social sciences as traditionally taught will not, of course, constitute the curriculum of instruction in the knowledge and skills of adaptation to differing types, settings, and locations of work. There will need to be more emphasis on the structure and functioning of occupations, of industries, and of organizations. Career patterns; the economics of obsolescence and automation; occupational trends and ways of recognizing occupational change; the functioning of the labor market; budgeting for seasonal and cyclical unemployment; the use of social security, public assistance, and retraining programs in making the transition from one job to another; the way of life associated with different industries, occupations, and regions are all part of vocational social science. For the miner's son leaving the hills of West Virginia for the slums of Chicago or Cleveland, knowledge of urban housing, transportation, and shopping are essential vocational skills. What good does it do him to find a job if he does not know how to use public transportation to get there and back, and how long will he keep the job if he cannot manage his living quarters in the radically different conditions of the city? Just as, in vocational rehabilitation, the blind are taught travel techniques, so in vocational education the rural inhabitant needs, at a higher conceptual level, to be taught urban living. If he does not move to the city on graduation from high school the chances are that it will be because he moved there earlier, when he dropped out of school.

If the social sciences cease to be purely academic subjects and become at least in part vocational, how will they be taught in the vocational curriculum of the future? They will, we may be sure, cease to be taught largely by means of written and spoken words, by books and written assignments. Even the widely used, less abstract methods of movie and television will not suffice, although they will help. There will be more and more varied use of field visits, more involvement as in organized and perhaps "made" part-time and vacation work, for exploratory purposes.

The capacity to change will be developed by experiencing change under supervision. Instead of working on one cooperative or vacation job assignment, the student will work on a sequence of such jobs, each different from its predecessor, each in a setting different from that which preceded it. A boy will be a jumper, a soda jerk, a wrapper, a gas station attendant, in succession. With the help of his coordinator and his classmates, he will consider not only the knowledge and skills needed in each of his jobs, not only the human relations and economics of each situation, but also the problems of changing and adapting from job to job and from industry to industry. When he is asked to change because his work is not satisfactory, the reasons, his awareness or lack of awareness of them as they developed, the steps he took or might have taken to avoid discharge or to pave the way for moving to a more suitable position, will be reviewed.

These are all done now, to some extent, in cooperative education, but they are done incidentally to training in a particular occupation. Here they will be done for their own sakes, for training in versatility, for education that will give people stability in change. Vocational education in the secondary school will be exploratory rather than preparatory, except for work in the basic skills. The exploratory experiences will prepare the semiskilled worker for a life of change. It will also, as pointed out earlier, lay the foundation for a wise choice of specialized field in the case of future skilled and technical workers who will go on to occupational training in special institutes, in the armed forces, and in industry.

There will be some very real problems in the development of curricula for the semiskilled. In some instances, the content and methods of instruction will be too academic, too abstract, and too unreal to challenge the interest and to maintain the efforts of the future semiskilled worker. The content will have to be developed in some areas; for example, vocational economics as a specialty is nonexistent. The methods will have to be developed in other areas; for example, occupational sociology has, to date, been a subject only for college and graduate students, to be used by students of human behavior or by industrial managers. Opportunities for work experience for high school students have never been easy to find, unless employers have felt a real manpower shortage. But this is something that rarely happens at the semiskilled level, the case of domestic service to the contrary notwithstanding. But these are problems that can, with imagination and motivation, at least in part be solved.

THE NEW LEISURE CLASS

Historically, the leisure class has consisted of the few who, because of inherited or acquired position, were spared the drudgery of work, or who, if they worked, did so at their own desire and in self-selected ways. Exemption from drudgery in itself gave people a valued role, and playing the role in a way that demonstrated one's leisured status was for many a satisfactory way of achieving distinction. Leading a band of soldiers was partly occupation, partly avocation; hunting foxes, stags, and boars was purely avocation (there are better ways of ridding farms of pests than riding pell-mell across cultivated fields); gambling, dancing, and flirting were courtly activities; and those with more intellectual inclinations could, like Montesquieu, find outlets for them in philosophy and in politics, or, like Lavoisier, in chemistry and in politics.

But we are experiencing, in the second half of the twentieth century, a social revolution in which only a minority of the able and educated seem likely to have the privilege of working. Only the highest level work will need to be done by humans—all production and distribution, and many services, will be performed by automated equipment. The affluent and automated society will support the ex-workers in a life of leisure that will be socially acceptable because general and unavoidable. But what roles will be open to the new leisure class? What will replace the work role that still plays so important a part in organizing and in giving meaning to the lives of most men and many women? How will men achieve the status, the sense of purpose, the feeling of competence and mastery, and the satisfaction of being needed that occupations now provide them? Not, surely, by having more time for bowling or for golf, for television or for comics, superior though these may be in social desirability to fox hunting *à l'anglaise* or gambling Monegasque.

AVOCATIONAL EDUCATION

In due course, therefore, vocational education may phase into avocational education. Even if work is shared or made, even if everyone works a fifteen- or twenty-hour week, education for leisure will have to go hand-in-hand with education for work, and it seems likely even to replace it. But social inventiveness will be called for to develop new roles in which men and women may achieve mastery and distinction, people will need to be educated to appreciate these roles, and education will need to equip people to play them with skill and satisfaction.

Notes

[1] D. C. Miller and W. A. Form, *Industrial Sociology* (New York: Harper & Row, 1951).

[2] P. E. Davidson and A. D. Anderson, *Occupational Mobility in an American Community* (Stanford: Stanford University Press, 1937).

[3] Miller and Form, *op cit.*

[4] U.S. Department of Labor, "Job Changing and Manpower Training," Manpower Report No. 10, Office of Manpower, Automation, and Training (1964).

[5] D. E. Super, "Education and the Nature of Occupations and Careers," *Teachers College Record* (1957), pp. 301–309.

Charles R. DeCarlo

Work and Vocational Education

Vocational education—its theory and practice—has assumed increasing prominence and importance in the past few years. This is largely the result of the unemployment problems associated with the entrance of teen-agers into the labor force, the changing of jobs under technological employment, and the increasing school population. Faced with such problems, it is natural that the public should vent its frustrations and concern upon vocational education as the most seemingly related and obvious responsibility. A typical reaction suggests that if we are having difficulty training people up to appropriate job levels, or finding people with appropriate skills for available jobs, it follows that education and training must be the culprits responsible for the dilemma. The *New York Times* has pointed out the urgency of the dilemma:

> Figures for mid-April, published last week, add emphasis to the quest for a solution. They show a sharp rise in joblessness among persons 14 to 19 years old, to 15.2 per cent of the labor force (those working or seeking work), from 13.9 per cent a month earlier.
>
> Among non-white teen-agers, the percentage is double the average of all teen-agers, and among Negro girls higher yet. One in three teen-age Negro girls in the labor force is unemployed.
>
> Urgency in finding a solution results from the fact that in the year ending June 30, 3.7 million young people will reach the age of 18 – 1 million more than a year earlier.[1]

While the unemployment problem, particularly of youth, may continue to be an urgent situation, the long-range implications of the changing nature of work itself are probably of considerably more importance. It is against the background of such future changes that the present status of vocational education should be considered and planning for its future should be made. To do this, several key assumptions, implicit in the notion of vocational education and the world of work, must be examined. These are:

1. There exists a set of trades or crafts for which a young person, through a combination of practical work and supporting theoretical subjects, can be prepared.

2. Such trades and crafts tend to be stable as occupations over long periods of time. This implies that techniques and machinery associated with the jobs change with relative slowness.

3. It is to the student's advantage to make an early career decision in terms of his ultimate occupational choice. In this way he can be given appropriate training so that on the completion of high school he will be prepared to contribute productively to the work process.

4. Differences in social and economic backgrounds, intelligence, and aspirations force a split in public education between the college-bound and the work-bound. The concomi-

tant of this is to make inferior or second-class those programs associated with vocational or occupational training. This "separatist" approach is accepted as a condition for vocational education programs.

5. Because of the applied nature of the material involved in vocational education cases, teachers must have practical experience, even at the expense of other educational qualifications.

Not only are the preceding assumptions invalid, but they represent harmful and dangerous circumstances in the preparation of youngsters for participation in the adult world. That this is so follows from the changing nature of work in the world of today and of the future.

First, there is the fact that the work world, including the processes of production, distribution, finance, and control, is becoming increasingly characterized by cognitive functions rather than muscular skills. This is made evident in the census statistics, which show the lower-skill-level jobs declining as the white-collar jobs increase. The amount of paper work associated with even the smallest of enterprises today dictates the need for a minimum command of communication and reasoning skill on the part of the lowest employee.

Another way of looking at the same aspect is to consider the increased productivity in the work world as the result of application of machines and the rationalization of work. Through application of science and technology, there has been established in America a per capita amount of energy hundreds of times greater than that which exists in the backward nations of the world. Implications of this fact are not only a higher standard of living but, importantly, that men work in environments characterized by man-machine relationships. This is true not only in the large mills and the electronic computing centers but also in the auto mechanic's shop, warehouse, and small business enterprise. It is safe to say that jobs which even today require a fair amount of manual work are embedded in an environment of machines, prime movers, control devices, and the like. This points up a need for some general understanding of elementary mechanical devices and the principles of energy conservation and transformation. Not only is this understanding desirable in terms of the work experience of the individual but of his total life experience. Arthur Koestler, in the *Act of Creation,* speaks of the "urban barbarians"—those people who make use of the fruits of technology and are completely apathetic about the nature and magic of its processes.

A third aspect in the world of work derives from the fact that as work becomes increasingly cognitive and related to machines, there is built up a demand for large, efficiently designed systems. Systems design includes not only physical systems, but also the design and control of the large human organizations that are a necessary adjunct in the development and operation of the technological society. In this regard, individuals employed in the work world must be engaged in new levels of man-to-man relationships. Because work tends to be organized in such a way that particular men and machines perform at best only parts of the whole, or participate in simple repetitive tasks, there results an integration of men and machines into "team activities." This demands, in both the *local* and in the *larger* organizational sense, a sophisticated level of interpersonal relationships. If, because of the application of technology to work, man is increasingly alienated from the totality of the work processes, it becomes vital that he find his meaningful relationship to the work process through participation with others as elements in the larger systems. This requires on a specific level that he communicate effectively with co-workers and managers on matters ranging from details of the physical operations to such complicated issues as benefits, payroll questions, employment policies, and the like. From these factors there flows a sense of dependence upon the larger organization for both security and identity in the work world. The effect of such work environment dependency is far-reaching upon the worker's role as citizen.

Another consideration in the new relationship between pre-employment training and the work experience is the role the job plays in establishing the individual within the community; in today's world the job environment is becoming increasingly the defining element of stability and identity in the individual's life. Certainly, since the end of the Second World War, the geographical mobility of the population has radically altered the stabilizing value of family ties and community roots. Every year one American in five changes his residential address and one person in four now lives in a state other than the one in which he was born. These and other facts of population mobility imply the importance of the job as an enduring mechanism for helping establish individual identity. On this score, Grant Venn, writing in *Man, Education and Work,* comments on the difficulty of introducing youngsters into the adult world:

> A man's occupation in American society is now his single most significant status-conferring role. Whether it be high or low, a job status allows the individual to form some stable conception of himself and his position in the community . . . but modern society increasingly denies opportunities for work during youth. There are no fires to build, wood to chop, or cows to milk for most young boys and girls; a boy may mow the lawn or wash the car, a girl may vacuum the rugs or wash dishes, but little formal work awaits them until they get a job. Since the modern economy hires only more mature people and since adults themselves measure status in terms of jobs, a job becomes the symbol of acceptance into the adult world. Neither religious ceremonies (which come too early), nor marriage (which for many comes too late), nor school graduation ceremonies (a good excuse for some new clothes and a round of parties) rank even close to the job as an initiation symbol.[2]

In view of the importance of the job-career decision to individual psychological well-being, it is important that early guidance and career counselling be strengthened.

Another major component of the work experience is the individual's requirement to deal with the organization within which he works. His understanding and responsible participation in the processes and goals of the employer organization, of the union or trade association, of professional and technical affiliations make demands upon the individual that tend to divide his loyalties. The problem of living with the many divided loyalties that the individual must handle in the modern world is a crucial one. When those problems of divided loyalties and interests in the work experience are set against other affiliated loyalties such as church, family, and community, it becomes increasingly clear that engaging in the adult work world today, with its man–machine–system relationships, is indeed a different world from that of fifty years ago.

An important characteristic of the work environment is the present availability of free or leisure time and the possibility of increasing such time through a shorter work week. In the early development of the vocational programs in the United States, not only is there the idea of an enduring and unchanging trade, but also the idea that such work would constitute the major waking time of the individual. However, even today, the optional time available to individuals far exceeds what might have been prophesied fifty years ago. Of course, there is much wringing of the hands and snobbish concern over the mass tastes and activities applied to the use of such time. However, a more positive view is to consider the present use of free time as the base upon which to build a better leisure in the future. This will require that all education be subject to the liberalizing influences of general studies. These general studies should actually complement the training that is required for participating in the world of work inasmuch as this training itself must be more biased to general education.

A final aspect concerns the individual's responsibility as a citizen. The pressing problems facing America as she is drawn into the position of world leadership require an informed citizenry. This is no longer a statesman's dream nor an educator's cliché. The sharp difference between the "haves" of the Western world and the "have nots" of the underdeveloped countries, and the collapse of space and time separating the two worlds, makes imperative the development of novel and creative national policies. These, by definition, will tend to be disruptive of old values and practices. Therefore, they can be successfully implemented only with the support of a populace understanding the need for a change. Only through general upgrading and extension of all public education can this be attained.

Many reports and books that discuss the present state of inadequacy in vocational education are available. All the charts, figures, and analyses seem to agree that new views and programs are required. The issues that must be considered are:

1. The real nature and ethics of the work process;

2. The problem of introducing young people in the work process;

3. The problems of retraining and adult education for those in the work process as well as those retired from it;

4. Compensatory educational programs for groups disadvantaged with respect to the work process.

With respect to the kind of education required as prerequisite to work, the following components are suggested:

1. General reading, writing, and communication ability equivalent to or better than the current twelfth-grade level;

2. Arithmetic ability, including ability to handle percentages and follow simple computational forms such as the income tax forms;

3. An elementary knowledge of accounting principles, including some notion of budgets and principles of cost allocation;

4. A knowledge of elementary principles of economics, including notions of capital, profits, government debt practices, and the like;

5. Elements of logical reasoning, including the ability to understand typical work procedures, preparation of forms, nature of contracts, and so forth;

6. An understanding of the basic mechanical principles of

the elementary machines, including motors, generators, combustion engines, linkages, levers, and power transformers;

7. Elementary knowledge of various electrical principles such as house wiring, operation of automatic dish washers, TV sets;

8. Other general and liberal education subjects.

The above may seem unreasonable and idealistic. However, considering the possibility of extending the present public education system through the fourteenth-grade level, and the application of appropriate monies to build schools, hire teachers, and so forth, they do not seem too far out of line as objectives.

In addition to upgrading of educational content, there must be the conscious development of the acceptance of change, both in things and of values, at every step in the educational process. In this way the individual will be prepared for the changing nature of his work environment, as well as for participation in a society whose chief characteristic in the future will be change.

Such upward revision of educational goals will prepare the young person to meet work environments characterized by the following:

1. Jobs that can be best learned by "on-the-job" training or by "special" training;

2. Jobs in which a minimum of technical skills in mathematics or general sciences is required, such as laboratory technician, data processing operator, and chemical laboratory technician;

3. Jobs on which a premium is placed on white-collar office skills, requiring a minimum of reading, writing, and communication ability, and interpersonal skills as well.

For example, the Minority Report of the Nassau County Commission on Vocational Education states:

> *The skills of many jobs for high school graduates, probably for most, may be readily learned on the job.*

Experts of the New York State Department of Labor have offered the following judgment: "Skills required by the bulk of industrial jobs are relatively simple ones. Most can be taught on a full-time basis in a few days, a few weeks or a few months. *Approximately two-thirds of all jobs in New York State at the present time fall in this category.* They include most jobs in the laborer, clerical, sales, service, operatives and farm workers occupational groups. The specific skills required by these jobs typically are taught by employers."[3]

This point becomes very clear in the light of the results of the Commission's survey of high school graduates of 1958, 1959 and 1960.

What types of jobs were these recent high school graduates holding four, five, and six years after graduation? Listing just a few indicates why so large a percentage does not call for any specific occupational preparation in the high school.

pasteurizer
assembler
waiter
food store clerk
warehouse clerk
teller
routeman
truck driver
mailman
postal clerk
floor waxer
office clerk
buyer
lithography cutter
lumberyard foreman
telephone coin collector
salesman—appliances, artificial flowers, bread, publications, photography, shoes, etc. (salesmen were among the highest paid of the graduates)
carpet installer

Secondly, many of the jobs that require a good deal of special knowledge or training can be learned only on the job. Examples might be a newspaper circulation manager, a manager of a bowling alley, a manager of a supermarket, a train dispatcher, or an airline scheduler. A great many jobs involve a familiarity with a very special type of service or commodity or even with the ways of a particular company, its personnel and practices; as a young man moves up the ladder of jobs, he is in many cases using highly specific knowledge that could not possibly have been supplied to him through pre-employment training.

Third, there are available to high school graduates many jobs that could use formal training but which are too specific in content and too limited in their employment possibilities for specific pre-employment training to be offered in the high schools. The Commission's survey of what the high school graduates are doing provided several dramatic examples of that:

policeman
fireman
upholsterer
ceramic caster
glazier
bartender
mortician
leather worker
lather
stationary engineer
asbestos worker
terrazzo worker
furrier
lens grinder
diamond setter

Fourth, access to an entry job is often determined by factors that ignore previous high school vocational training. An apprenticeship program generally characterizes entry into the skilled crafts in the organized building trades and it is to be found to a lesser extent amongst skilled shop crafts. These programs ignore high school vocational training. An advisory committee established by the Commission with respect to electricians reported: "The experience of the apprenticeship committee for the electrical construction business has been that in recent years the graduate with general academic preparation has progressed much better than those with a vocational school background."

Probably more significant than apprenticeship is the fact that industrial practices in hiring frequently disregard vocational training. Many of the large employers give aptitude tests and choose entirely on that basis. The New York Telephone Company and Long Island Lighting Company, both very significant employers on Long Island, prefer to do their own training. Their jobs: splicer, splicer's helper, frameman and lineman showed up frequently among the jobs held by recent high school graduates.

Many skilled jobs are secured only as a result of many years of climbing up a promotional ladder.

> Several observers have noted that the country happens to have more skilled craftsmen than apprenticeship or formal vocational training of any kind would ever account for. The explanation is that the skills are typically acquired in the course of many years of actual work.

Given the above, it becomes clear that in the long run the most desirable characteristics from the point of view of the employer will be a background of general education, a willingness to accept continued learning and retraining, the ability to work in team environments, and a willingness to accept change and mobility. These values obviously accrue as a result of an integrated general educational program. Such a program should have as one of its principal components familiarization with principles of various skills and trades, such as is now available in parts of vocational education and industrial arts programs and technical institutes.

New programs must be considered to solve the problems of youth training. First, more rapid development of the junior college and technical institute under public and private sponsorship should take place. This would have the effect of lengthening the education life by two years, permitting a more general education base. Such a program will probably eventually be developed by the enormous demand and rising educational expectations accruing as a result of the population bulge. There are now 453 public junior colleges and 280 private junior colleges with over 1.5 million enrollment. This figure must be drastically increased. A principal problem facing educators in this area is to make "acceptable and fashionable" the degrees granted by such institutes. Another is to develop programs leaving open the possibility of transfer into four-year colleges or professional schools for those who desire to go on.

Secondly, several proposals have been put forth for providing subsidy through industry for the introduction of youngsters into the labor force. It should be possible to develop methods whereby the resources of industry, both large and small, can be applied to solving this problem. The success of the G.I. Bill in education, in both raising the educational level of the country and providing for increased growth, could be a model for such a program. Further, such a program could be biased in such a way that disadvantaged groups are given special incentives. It should be possible to mount federal, state, and local community programs in concert with industrial firms if appropriate policies and practices are well thought out in advance. Of course, if such programs are developed, there will be excesses as there were in the case of the G.I. Bill. However, such excesses can be controlled, and even their existence is a small price to pay for the benefits accruing from successful subsidy programs.

Another way in which industry may participate is by making available part-time or early-retired individuals for teaching in such programs. This will require more flexible and creative programs on the part of state education departments. Here, again, joint activities by state agencies and industrial concerns could be profitably undertaken.

Another approach to the problem is extension of programs similar to those being undertaken by the federal government in concert with private business concerns for the training of youth under the "poverty bill" provisions. Here training facilities and competencies of the industrial world can be matched directly to critical training problems. Perhaps by expanding the program to include joint participation of the educational communities along with business and industry, a new and enduring instrumentality can be created for the solutions to the problems associated with pre-employment training.

The problem of admitting the young people to the world of work and economic process is one of fundamental social importance and one in which industrial leadership could play a significant role. In a very real sense, the child now depends on much more than the family relationship for his entrance into the adult world.

Erikson, in *Childhood and Society,* comments upon this problem of admitting the child into the adult technological world in the following:

> *The fundamentals of technology* are developed as the child becomes ready to handle the utensils, the tools, and the weapons used by the big people. Literate people, with more specialized careers, must prepare the child by teaching him things which first of all make him literate, the widest possible basic education for the greatest number of possible careers. The more confusing specialization becomes, however, the more indistinct are the eventual goals of initiative; and the more complicated social reality, the vaguer are the father's and mother's role in it. School seems to be a culture all by itself, with its own goals and limits, its achievements and disappointment.
>
> The child's danger, at this stage, lies in a sense of inadequacy and inferiority. If he despairs of his tools and skills or of his status among his tool partners, he may be discouraged from identification with them and with a section of the tool world. The child despairs of his equipment in the tool world and considers himself doomed to mediocrity or inadequacy. It is at this point that wider society becomes significant in its ways of admitting the child to an understanding of meaningful roles in its technology and economy. Many a child's development is disrupted when family life has failed to prepare him for school life, or when school life fails to sustain the promises of earlier stages.[4]

It is hoped that a beginning will be made in bringing to bear the joint resources of the industrial and educational communities toward finding solutions to the pressing problems of introducing young people into a meaningful work life.

Notes

[1] *New York Times*, May 9, 1965.

[2] Grant Venn, *Man, Education and Work* (Washington, D.C.: American Council on Education, 1964).

[3] New York State Department of Labor, *Jobs, 1960–70: The Changing Pattern, Manpower and Technological Change in New York State* (1960), p. 3.

[4] Erik H. Erikson, *Childhood and Society* (New York: Norton, 1964).

Seymour L. Wolfbein

Labor Force Trends and the Course of Vocational Education

In the latter half of the 1960's, vocational and technical education, thoroughly examined and diagnosed by a cornucopia of critical commissions and prescribed for by a stream of administrative and legislative actions, faces up to a variety of challenges, to a variety of standards, by which its viability will be judged. Not the least of these will be the manner in which it responds to the changes in the quantitative and qualitative parameters of the American job market.

This chapter briefly summarizes twelve dimensions of labor force dynamics, current and prospective, which will likely serve as the social and economic context for vocational and technical education in the United States.

1. Vocational education, at this particular juncture of Ameri-

can history, has become the major arena for the deployment of resources to meet and resolve two urgent and related social and economic problems.

The first is the problem of unemployment and poverty that public policy has decided to combat with an unprecedented commitment to education and training.

The second is the problem of discrimination—particularly, but not exclusively, on account of color—where public policy also envisages a major thrust through education and training.

It therefore turns out that, in the immediate years ahead, how vocational education fares becomes a matter of ultimate concern in the war against poverty and unemployment or—to state the matter perhaps more positively—in our efforts to help and restore the unskilled, the uneducated, and the unwanted.

The hard intelligence we have available on these matters underscores the importance of education and training generally, of vocational education in particular, as the bridge to gainful participation and gainful employment for the disadvantaged.

The month-after-month returns emphasize that one out of every three jobless in the United States never went beyond grade school; two out of every three unemployed failed to graduate from high school. The differentials in unemployment by educational attainment are enormous. The jobless rate for those with less than five grades of education is almost ten times the corresponding rate for the college graduate, more than double that of the high school graduate.[1]

Educational attainment turns out to be the independent variable of choice in the analysis of many unemployment problems; for example, the differentially higher rates of joblessness among so-called older workers disappears when standardized for educational attainment. The young man with less than a high school education has just as high an unemployment rate as his older colleague with the same educational attainment; the older man with a college degree has just as low an unemployment rate as his younger colleague with a baccalaureate.[2]

The relationship between education and poverty can be illustrated with just a few figures for 1963:[3]

Educational attainment	*Percentage in poverty*
8 years or less	37
9–11 years	20
12 years	12
Over 12 years	8

According to Decennial Census data, the unemployment rate for males 18 years of age and over was 4.8 per cent in both 1950 and 1960. However, that jobless rate *went up* by 20 per cent during the decade for those with the least amount of educational attainment and went down by 30 per cent among those with the highest amount of educational attainment. It was exactly during this decade that the United States became the only country in the world to deploy the majority of its workers in the white-collar occupations and in the service-producing industries.

Educational attainment is highly correlated with the degree of participation in the labor force, and the lack of it is apparently one of the causative agents in the absence of considerable numbers of adult nonwhites from the job market.

The lack of formal training—and especially of some vocational training—is highlighted by every study of the intractably disadvantaged. Only one out of six young men who fail the Armed Forces Qualification Test have had vocational training as a major course in high school.[5]

The key role of some kind of formal training is indicated by the fact that, for example, the unemployment rate for high school graduates without job training (in high school, in industry, in the military) was actually higher than that for nongraduates with training.[6]

The particular relevance of all these points to the minority groups has to be re-emphasized. A little over two years' difference in educational attainment separates the white and Negro labor force—but it is the difference between a little less than ten years for the Negro and a little over twelve years for the white; the difference between averaging and not averaging a high school education is much more than the arithmetic of a two-year difference would otherwise signify. In addition, the proportion of nonwhite workers with less than five years of schooling is about five times that of whites; the proportion of Negro workers with less than a grade school education is about twice that of whites.[7]

Much the same story is true for other minority groups. The most disadvantaged of all—the American Indian—has only about half the median educational attainment of the whites; the median for Puerto Ricans 14 years of age and over is two to three years lower than for the population of those ages as a whole; second generation Mexican-Americans score a median educational attainment of more than two years under the total population and the proportion with a high school education is less than half of what prevails for the population generally.[8]

A renewed conception of vocational education has to encompass a deliberate, overt, purposive thrust into the problems of serving the training needs of these disadvantaged groups.

The exigencies of the job market in relation to this problem can finally be illustrated as follows:

Unemployment Rates for Teen-age Males (Seasonally Adjusted) Third Quarter—1957, 1964, and 1965

	3rd Q, 1957	*3rd Q, 1964*	*3rd Q, 1965*
White	10.0%	12.9%	11.9%
Nonwhite	17.4	25.0	21.6

2. A brief, but separate, point seems warranted in view of what has been said so far: Vocational education, in order to play a role in providing meaningful pathways for disadvantaged groups, needs to provide more than skill endowment. It also needs to play a critical role in *occupational education*—in providing an education about the world of work itself and other features of the American environment as well as a vantage point for the development of motivations about and responsibilities toward that environment.

One of the favorite criticisms of vocational education of the past involves the point that 60 per cent of all people in federally aided vocational classes at the secondary school level in 1963 were enrolled in home economics programs.[9] This represented a total of almost 1.2 million girls, and, while some of them do go on to pursue this course of study and end up in such excellent fields as hospital or industrial dietitian, the sheer numbers do look significantly out of balance in relation to the job market.

However, too many Negro girls get their first view of white, middle-class kitchen equipment right in those home economics courses to warrant derogation of this kind of *education.*

If education, and particularly vocational education, is to be used to widen horizons and improve motivations—necessary conditions for success in making vocational education responsive to some of these needs—then it has to be broadly conceived and not narrowly zeroed in on the demands of the job market, important as that dimension may be. In fact, it will not be responsive to the needs of many people in their relations to the job market if education is not so broadly conceived.

3. The need for a greater outreach (the current favorite in the lexicon of the trade), particularly by vocational education, is shown by the following tabulation:[10]

Educational Status in Fall of 1964 of Young People Who Entered Fifth Grade in Fall of 1956

Educational Status	*Percentage*
Total	100
Dropped out before reaching high school	7
Dropped out while attending high school	26
Graduated from high school	67
With no significant vocational preparation	16
Completed high school commercial course	7
Completed high school vocational education course (other than home economics)	4
Went on to occupational program in junior college	4
Went on to college	36

Aside from the 33 per cent who never got the high school diploma, another 16 per cent did graduate from high school as the terminal stage of their education, but with no formal training. Another way to put this is that no more than about half of all young people moving through our educational plant either go on to college or graduate with a significant amount of occupational training—the quality of that training and its relevance to the needs of the job market aside.

4. In this connection, it ought to be pointed out that for some time now vocational education actually has been the first-ranking method of formal training for that part of the American labor force (86 per cent) that has not gone through college.

In a recent survey,[11] the Labor Department found that high school vocational and commercial courses were the largest single source of training, accounting for about two-fifths of all formal training completed by workers 22 to 64 years of age (excluding those with three years of college or more); for women, the proportion was more than 50 per cent. The summary tabulation that follows indicates that another 11 per cent received formal training at junior colleges and technical institutes where a substantial amount of post-high school vocational and technical education is given:

Source of Training Programs Taken by Workers 22–64 Years of Age Excluding Those with Three or More Years of College

Source of Training	*Total*	*Men*	*Women*
All sources	100%	100%	100%
High school	38	30	55
Special school	19	15	28
Armed forces	11	16	1
Apprenticeship	8	12	1
Company school	7	7	5
Correspondence school	6	8	2
Technical institute	6	8	2
Junior college	5	4	6

The same survey showed that formal training received in high school was actually the most important source of training for workers of the age group and education we already have noted in 1963 in the following occupations:

- agriculture
- auto mechanics
- general trades
- merchandising

bookkeepers
compositors and typesetters
dressmaking
secretaries
stenographers
typists

Formal high school training was listed as a major secondary source of training for the following fields:

accountants and auditors
brickmasons
carpenters
metalworkers
draftsmen
electricians
machinists

In addition, technical institutes in 1963 were the most important source of training for draftsmen and engineering and physical science technicians and were a major secondary source of training for electricians, engineers, and radio and television mechanics.

The same survey that yielded these data also spoke to some other points that are relevant here and to the previous sections. For example: The more education workers have, the more likely they are to have had formal training—a good deal of it in more than one field or skill. (In this survey, training for an occupation was counted only once even if the worker had more than one kind of instruction; for example, carpentry learned initially through a high school woodworking course and then perfected through apprenticeship counted as one field or skill for which training was taken.)

Thus, only one-sixth of the workers who had no more than an elementary school education had formal job training, but two-thirds of the high school graduates did.

Only 15 per cent of the trained workers with an eighth-grade education or less had more than one kind of training, but 40 per cent of those with some college had learned two or more occupations, giving them more flexibility in the development of their skills.

Smallest proportions with formal training were found to be among the nonwhites and unemployed, tending to confirm some of our previous points. For example, only about one-third of the nonwhites had formal training in contrast to a ratio of one-half among the whites.

5. All of this formal training—in which vocational and technical education predominated—has one other feature that should be separately underscored: despite changes over time, workers have found formal training of lasting value in their jobs. Over four-fifths of the workers with training had put it to use during their working lives and fully three-fifths of them were using it in their present jobs.[12]

These proportions are actually higher than they appear to be because the overall figures cited include training for men in such occupations as bakers or airplane mechanics given in the military, for which carryover into civilian life was relatively small.

Here again, significantly larger proportions of nonwhites than whites never used their training on their jobs—34 per cent for the nonwhite men compared with 20 per cent for the white men.

6. A real-life experience has been conducted during the past three years in the field of training and retraining under the Manpower Development and Training Acts, and it holds some major lessons for the subjects under consideration in this volume.

In the first place, the retraining programs, predominantly conducted in occupational fields in which vocational education is the prescribed course of training, predominantly held in vocational education institutions and typically taught by vocational educational teachers, have shown that this kind of effort can be successful. For example, retraining programs in 1964 had a 28 per cent nonwhite enrollee rate and almost half of all trainees met the official government definition of long-term unemployment. The proportion of nonwhites compared quite favorably with their proportion among all unemployed (21 per cent) and the proportion of long-term unemployed was double that among all unemployed.

A job-placement rate of over 70 per cent for a vocational retraining program with this kind of clientele is a matter of substantial encouragement. Incidentally, a significant proportion of these trainees would have been receiving their unemployment insurance benefits anyway. To have taken on training and received some skill endowment is a net gain in itself and more than incidentally speaks to the motivations, the great desire for up-to-date training on the part of the unemployed.

7. In this connection, the role of vocational retraining in *upgrading the skills of the work force* as well as helping jobless back to gainful employment is a matter that warrants some highlighting. The details of this dimension can be found elsewhere;[13] the following example for the unskilled is typical:

Occupations that Persons Whose Primary Work Was Unskilled Before Training Were Preparing for in 1964 Under the Manpower Act

Total	100%
Semiprofessional and technical	5.5
Clerical and sales	8.7
Skilled	42.8
Semiskilled	23.0
Service	11.0
Other	9.0

For this program as a whole in 1964, 10 per cent of all trainees were pursuing courses leading to semiprofessional and technical jobs; only 2 per cent were in those fields before embarking on a training course. Similarly, 30 per cent of all 1964 trainees were learning a skilled job; only 7 per cent were in skilled employment before joining the training program.

8. Of particular relevance to the subject of this chapter is a provision in the basic manpower training legislation that retraining programs can be initiated only upon documentation of at least some favorable prognosis for job placement at the end of the training period. This kind of requirement is obviously an important part of the reason why the placement ratio has been as high as 70 per cent so far. No guarantees on job placement are required, and, given the vagaries of the shifting short-term area labor supply-demand situations, there is bound to be considerable slippage in these efforts; but there is no gainsaying the evidence of these past few years in underscoring the desirability of a close (but not rigid) nexus between the realities of the job market and vocational train-

ing and retraining—a connection that is quite forcefully highlighted in the provisions of the Vocational Education Act of 1963.

Against this background, it is pertinent to note the ten leading occupations in which training was given under the Manpower Act in 1964—in order of number of enrollments:

stenographer
nurse aide/orderly
licensed practical nurse
typist/clerk typist
welder
general machine operator
auto mechanic
general office clerk
auto body repairman
cook

The details of this story also can be found elsewhere,[14] but it is important to note that recent and projected occupational trends underline the fact that the job outcome is excellent in most of the areas for which vocational and technical education are preparatory.

Of particular significance in terms of job trends are the following:

In the semiprofessional and technical fields: Health fields, especially in the nursing job complex and lab technicians; engineering and physical science technicians and draftsmen.

In the clerical field: Excellent outlook in the office occupations, particularly secretarial, typing, general office work, and the operation of various office machines.

In the skilled fields: Major uptrends in all work associated with repair and maintenance of automobiles; various welding occupations; operation and repair of complex industrial machines; substantial employment thrust in the field of servicing and repair of home and office equipment.

In the semiskilled field: Substantial uptrend in machine operators and assemblers; shortages of qualified auto-service men.

In the service field: Open-end demand for nurse aides; occupations in the restaurant-food complex, for example, cook, chef, waiter, waitress, and in the hotel industry.

How these current trends fit in with the longer-term picture can be seen by the reader from the following table, which gives official Labor Department projections for the major occupational groups:

Percentage Change in Employment 1960–1975
Major Occupational Groups in the United States

Total	31%
Professional, technical	65
Service	51
Clerical	45
Sales	34
Managerial	32
Skilled	30
Semiskilled	18
Unskilled	0
Farm	−28

9. This evidence of the past few years seems to be quite conclusive in emphasizing the fact that vocational and technical education can have a major impact in the field of retraining and upgrading workers at various stages of their working lives. This should be one of its prime goals in the future, especially in helping the labor force keep flexible and responsive to changing demands, and kindling into reality the axiom about education being a lifetime process. Our most recent information[15] shows that the average male worker, at current rates, can expect to make between six and seven separate and discrete job changes during the course of his working life, and it is necessary for vocational and technical education to be responsive to this kind of labor force phenomenon.

Evidence from the training and retraining efforts of the past few years also underscores the fact that there is still a long way to go in providing meaningful programs for many of the disadvantaged. For example, in 1964 only about 14 per cent of all enrolled trainees were in the lower tiers of educational attainment (eight grades of school or less). Six out of every ten of all our trainees were high school graduates or better. Placement rate varied inversely with the level of educational attainment of trainees:

Educational Attainment of Trainees	*Employed Graduates as a Percentage of All Persons Completing Training in 1964*
Under 8th grade	68.2
8th grade	69.6
9th to 11th grade	71.0
12th grade	72.5
Total	71.7

In a previous section the ten leading occupations for training under the Manpower Act were cited. The proportions of trainees in each of the ten who had a high school diploma are significant:

Stenographic	88.0%
Typist/clerk-typist	75.0
Licensed practical nurse	74.0
General office clerk	73.0
Nurse aide/orderly	48.0
Machine operator	48.0
Auto body repairman	39.0
Cook	39.0
Auto mechanic	38.0
Welder	37.0

These and other facts emphasize again that, if vocational education is to perform for the disadvantaged, it has to develop new concepts and new techniques for reaching, motivating, and training people. The experimental and demonstration projects of the Labor Department[16] indicate that here, too, progress can be made with newly developed curricula, methodologies, and approaches, and the Vocational Education Act of 1963 also deliberately allocates funds for research and experimentation in this area.

The changing job needs of the American economy and the new aspirations and goals of public policy in the 1960's relating to unemployment and poverty argue for a major new conception of vocational education: to experiment, to perform research and developmental work on how to make it more responsive to the nub of its task; to strike a more perfect match between the needs of the people involved and the opportunities of the economic environment.

10. Moving to a completely different field and thereby illustrating the all-encompassing arena in which vocational technical education operates, it is recalled that, so far, federally aided programs have had a relatively small impact at the *post-secondary level.* Only about 8½ per cent of all persons enrolled in federally aided vocational education classes were receiving instruction beyond the high school level—and fully half of these were in the trades and industry programs, mostly as apprentices enrolled in technical courses that were part of their courses of training.

Substantial change should occur in this kind of configuration in the profile of both federally aided and other public and private vocational education efforts. Enough has been already indicated to underscore the fact that a growing proportion of job fields for which vocational technical education is preparatory is subject to one of the major current and prospective trends: the increasing educational and training prerequisites for employment to begin with, for continued employment, and for advancement.

11. Vocational education, like just about every other educational field, has been engaged in a major effort during the postwar period to try to keep up with the burgeoning numbers who make up their clientele.

It is now time (if it isn't already past due) for the proposition that the quest for better and better get at least equal attention with the frenzied race for more and more.

One of the most interesting facets of studies of consumption patterns of families is the change that occurs in buying habits with increasing resources. At low levels of income, families are faced with the sheer problem of getting enough; the quest is for more and more. As resources increase, buying patterns change and the family starts looking for a better grade of meat, a better fabric in clothing, and the like; the quest turns to a search for better and better.

In fact, the budgets that underlie studies of levels of living, which, in turn, shape the market-basket price for the monthly consumer price index, tries to aim at that point of the inflection of the curve of consumption patterns at which that turn from quantity to quality occurs.

It is suggested that the point has now been reached in the history of vocational education (as very possibly in other educational endeavors) where additional resources are being made available that make it possible to face up to the problem of *quality*.

It is doubtful whether any documentation is needed for this proposition, but it may at least be of some interest to note that of all the men who fail the Armed Forces Qualification Test (the equivalent of about an elementary school education) *20 per cent are high school graduates.*[17]

12. Quality is a difficult word, a difficult concept to get across, and quite difficult to objectify. As a minimum, it should involve an improvement and sustained excellence in the up-to-datedness of the equipment used and in the relatedness of the substance of instruction to needs of the social and economic environment.

It must also include improvement and sustained excellence in the up-to-datedness, substantive knowledge, flexibility, and responsiveness on the part of the teachers and trainers in the field. Here again, it is difficult to see how the goals, implicit and explicit in the first ten points, can be reached without moving on this matter of the quality of vocational education personnel.

As in all other fields, the factor of quality will be resolved and played out through the utilization of the key professional personnel. In the years ahead patients will continue to be doctored, clients counseled, pupils taught, and so forth. The chances are that the numbers will be there for all to see, but the acid test of performance is going to be more and more *how well* those numbers get doctored, counseled, taught.

The dozen points summarized in this chapter make it clear that, perhaps with minor changes of words or emphasis, most of the points could probably relate to all other fields of education and training with similar force. But that may be exactly the prime point to make about vocational technical education at this juncture of history—it has to take its proper place, in tandem with other fields, to move in on the social and economic problems of the last third of the twentieth century.

Notes

[1] D. Johnston, "Educational Attainment of Workers, March 1964," *Monthly Labor Review*, May 1965.

[2] *Manpower Report of the President*, March 1964, p. 135.

[3] *Economic Report of the President*, January 1964, p. 61.

[4] *Manpower Report of the President*, March 1964, chap. 4.

[5] President's Task Force on Manpower Conservation, *One-Third of a Nation*, January 1, 1964.

[6] U.S. Department of Labor, *Formal Occupational Training of Adult Workers*, Manpower/Automation Research Monograph No. 2, Office of Manpower, Automation, and Training (December 1964).

[7] *Manpower Report of the President*, March 1964, chap. 4.

[8] *Ibid.*, chap. 5.

[9] *Manpower Report of the President*, March 1965, p. 99.

[10] *Ibid.*, p. 100.

[11] U.S. Department of Labor, *op cit.*

[12] *Ibid.*

[13] U.S. Department of Labor, *Manpower Research and Training*, a report by the Secretary of Labor, March 1965.

[14] *Ibid.*

[15] U.S. Department of Labor, *Job Changing and Manpower Training*, Manpower Report No. 10, Office of Manpower, Automation, and Training (June 1964).

[16] *Ibid.*

[17] President's Task Force on Manpower Conservation, *op. cit.*

Paul C. Rosenbloom

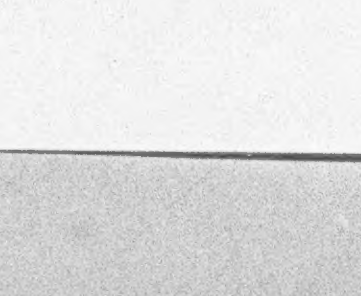
Vocational Education for a Changing World

THE PROBLEM

How can a youngster be prepared to work in a world that is changing so rapidly that almost any job he takes will change within a few years?

Many jobs will become obsolete, while new kinds of jobs will be created. It has been estimated that in the year 1970 about one-seventh of United States income will be spent on goods and services that have not even been invented yet.

Only vague predictions can be made as to what specific



changes will occur. Only that the rate of change will increase is certain.

SOME PHILOSOPHY AND HISTORY

The current clichés regarding vocational and liberal education are rooted in a tradition dating back to Plato. He defined liberal education as education appropriate to a free man. He designed a model system of liberal education for a society, like the Greek society he knew, in which most work was done by slaves. A free man was a man of leisure. It was acceptable for him to become an amateur, to do something for the love of it and well enough to please other amateurs. If he did anything so well that he could support himself at it, he lost caste. Any man who worked for a living was not much better than a slave.

America received her concept of liberal education from the British, who handed down the tradition of the medieval scholastics, who tried to model their practice on Plato's theories. Until about 100 years ago, higher education and preparatory schools in the United States were directed primarily at the education of gentlemen.

The public school movement and the land-grant colleges introduced a new concept of education for a free man. If a man can support himself, then he is to that extent his own master. So vocational education becomes the basic form of liberal education for United States society.

About 1910, when the movement to transform high schools from institutions for the elite to institutions for the masses was launched, only one child out of nine who entered first grade graduated from high school, the assembly line was being introduced, the old apprenticeship system was breaking down, and 50 per cent of the population were engaged in farming, 40 per cent in unskilled labor.

So the vocational education recommended by the Commission on the Reorganization of Secondary Education in 1917 was aimed at low-level repetitive tasks requiring only elementary literacy in reading and mathematics.[1]

The system of mass education for the America of 1910 was finally achieved nationally in the decade 1935–1945. While its inadequacies received the attention of a few people in high places during the next decade, a really concerted attack on the problems began only about 1956.

Vocational education programs have been dominated by the idea that work must be irksome, so that people will work only if they are paid for it. They will do what they really want to do after work or after retirement. In spite of all efforts to teach worthy use of leisure, most people don't know of anything better to do with their time than to kill it.

The world of work ushered in by automation presents both a challenge and a glorious opportunity. This is an era in which anything that can be done by machine will be done by machine. A man will be able to support himself only if he can do something essentially human, requiring intelligence, judgment, or taste.

Simultaneous with this development, there has been a political movement among vocational educators. They have been trying to escape from vocational education as the traditional dumping ground for low-ability students. They are now trying to place exclusive emphasis on the highly skilled trades and the training of technicians.

I have held two conferences with the heads of all eighteen public vocational schools in Minnesota, which is probably typical. Every one of these schools is becoming as highly selective as the college preparatory programs. Whenever I have brought up the question of the bottom quartile of students, they have replied, "It is a terrible problem. Somebody ought to do something about it. But not us!"

Education of craftsmen and technicians is, indeed, extremely important. It is certainly necessary to consider seriously the needed improvements in that area. But attention must also be devoted to the problem of the low-ability youngsters, and plans for experimentation with their education must be made.

The problem is not as hopeless as most people seem to think. I.B.M. is conducting extensive research on the problem of teaching computers to read print. It turns out to be extremely difficult to teach the idiot slave to recognize the letter "e," no matter in which font it may be printed! Yet this is a task that most children who are admitted to school can learn. This encourages the belief that even quite stupid human beings can learn things that are difficult or impossible for machines to do.

Some educational experiments now under way are also encouraging. The Biological Sciences Curriculum Study (BSCS) has developed special materials in biology for the bottom 20 per cent of tenth graders, and they seem to be working quite well. In 1965, there were about thirty-four experimental classes in slum area schools in New York, Chicago, and Los Angeles, using Max Beberman's new seventh-grade mathematics course. The University of Minnesota and Minnesota State Department of Education are having considerable success with their primary-grade mathematics and science materials in slum area schools in Brooklyn, Tallahassee, Houston, and other cities.

In 1964, the U.S. Office of Education, jointly with the National Council of Teachers of Mathematics and the School Mathematics Study Group (SMSG), held conferences on low achievers in mathematics.[2] Certainly the anticipated passage of the Economic Opportunity Act and the expected emphasis on reading, mathematics, and vocational education stimulated the calling of these conferences. Both Project Literacy and the Hunter College Center for Project English have given a great deal of attention to the problems of educating low achievers in the language arts. The major social question is how far down in the ability scale the mining of human resources should go. Scarce resources in talented manpower, time, and money must be invested in the development of effective educational programs for low-ability youngsters. Should a line be drawn somewhere, and a rule established, such as, "Below this level the investment will not pay off, so we will accept the youngsters as social charges." It is more exciting right now to explore what useful knowledge and skills can be taught even very low-ability students before considering the question of a possible cut-off point.

As automation continues to move toward the human use of human beings, a possibility arises that vocational education may be transformed into something approximating the literal meaning of the words. Can some essentially human ability be found in each person, and can some task be found to which he can apply this ability and undertake as a calling? Can he find some work in which he fulfills himself, which he would rather do than anything else?

Can this philosophy be built into a very flexible framework of vocational education, in which the youngster is plunged into an environment of constant change? He should be surrounded by an exciting atmosphere of new jobs coming up all the time, requiring him to make and do new things frequently. He should find learning so interesting that he will want to continue to learn after the age of compulsory schooling. He should be confronted during his educational experience with fascinating tasks requiring learning at whatever level he is capable of.

Another factor that must be considered is the expected increase in leisure time. At a meeting of leaders of the Rubber Workers Union held some years ago, it was decided that the union would try to obtain for its members their share of increased production per man mainly in the form of free time and financing of various educational and recreational programs.

All industries that serve the leisure time of man will face a heavy increase both in demand and in need for manpower during the next few years. The vocational education of manpower for these industries must be considered quite seriously.

Furthermore, the extent to which the administrators of vocational education programs develop judgment and taste will determine which of these industries will compete successfully, and at what level.

Finally, graduates from vocational education programs increasingly move into management through the routes of foreman, supervisor, or contractor, or into labor union office, or into public service. The social studies curriculum allied to vocational education should, for students having good communications skills, provide orientation to such avenues for advancement.

A SUGGESTED SHORT-RANGE PROGRAM

A program is here set forth for finding out what substantial improvements in vocational education can be introduced on a large scale by the fall of 1968 or 1969. Such improvements will be necessarily modest and conservative, accepting the existing structure of the vocational curriculum and demanding a minimum of in-service education of teachers. The proposed joint effort of research scholars and vocational educators would, by involving decision makers in all segments of vocational education at all levels of policy making, ensure the prompt acceptance of the improvements.

The suggested project is modeled on those that have been successful during the last nine years in improving the curricula in mathematics, physics, chemistry, biology, and the earth sciences.[3] If the experience in these areas can be generalized, it is expected that the initiation of such work in vocational education will arouse creative minds in that field and among research scholars and will generate a ferment that will lead to even more extensive long-range improvements.

The support for this work in school mathematics and science has come mainly from the Course Content Improvement Section of the National Science Foundation. More than ample funds are presumably available for the support of analogous work in vocational education through the Vocational Education Act of 1963, the Manpower Training and Development Act, and the Economic Opportunity Act.

A conference should be called to plan a summer writing conference. The mission of this two to three day planning conference would be to:

1. Identify priorities on courses to be produced
    a) at junior high school level
    b) at senior high school level
    c) post–high school level
    d) for dropouts, Job Corps, etc.
2. Choose executive director and steering committee.

The conference should include leaders in vocational education; teacher educators; scientists with experience in curriculum projects; representatives from industry, labor, and government; manpower experts; and various others who are active in the field.

In considering which courses are to be developed, the priority should be placed on those that fit into the existing structure of vocational curricula. Attention should be given to the needs in industrial, business, and service occupations. Decisions should be made regarding the concurrent or subsequent development of related courses in mathematics, science, English, and social studies.

An examination of the mathematics and science courses in vocational schools warrants some conclusions. These courses could benefit considerably from the new developments in the science and mathematics curricula. Material could not be taken bodily from the new courses but would have to be entirely rewritten to adapt to the special needs and motivations of students in vocational curricula.

To illustrate the kind of thing that will be needed, the existing courses for carpenters and other woodworkers should be examined, not only by vocational educators, but also by the steering committee of the Society of Wood Science and Technology's study on education in that field. The curriculum for business education should be examined by the developers of modern data-processing equipment. Among the people who examine the curricula for machinists and draftsmen should be some who are developing computer programs to automate these processes.

A proposal for the planning conference should include a budget for a small headquarters operation. During the first year, the director should be drawing up and submitting a proposal to appropriate agencies for support of the continuation of the project. He should also be setting up a national network to search for talent.

The writing conference should last eight to ten weeks. Its main activity should be drawing up outlines for the courses to be produced. The writers may also produce some sample units to be tried out on a small scale during the following year, primarily in situations in which there is direct contact with the writers.

During the following school year, the main activity will be revising and refining the outlines written during the previous summer. Some feedback from the small-scale tryouts should be arranged. A larger team will be recruited for a summer writing conference at the end of that year.

During the second summer conference, first drafts of the new courses will be written. They will be tried out at ten to twenty centers during the following school year. On the basis of the feedback the cycle of revision and tryout will continue until the courses are in satisfactory form.

As the new courses take more specific shape, the needs for equipment development, in-service and pre-service education, and research studies will emerge. These can be planned after the first summer writing conference.

It is improbable that any single curriculum will meet the needs of all students, all teachers, and all schools. After the work gets under way, it will be seen whether different groups will try to produce competing alternatives, as has happened in chemistry, or whether a single group will produce several alternatives, as has occurred in biology. It is urgent, however, that some group take the initiative to get the work started.

A SUGGESTED LONG-RANGE PROGRAM

For long-range improvements, there should be no preconceived notions of what students can learn or what the formal structure of vocational education should be. An activity of research and development in close contact with youngsters learning substance is called for. The students must be exposed to an environment of frequent change, with direct contact with impending changes in industry. To the extent that his ability permits, the youth should acquire experience in a variety of tasks so that he is pressed to become as versatile as he can.

The establishment of a Laboratory for Experimental Vocational Education and Research (LEVER) is suggested. At the center of LEVER would be an experimental shop, adjoined by a materials and equipment testing shop, adjoined by a science laboratory and probably a production shop also. Of course, there would be many other classrooms surrounding this central complex. There would be offices for a resident research and development staff, as well as a teaching staff.

The mission of LEVER would be to conduct an experimental educational program of its own, ranging from about junior high school level to manpower retraining and a graduate program for research and development people in vocational education. It would also produce materials and equipment for instructional programs elsewhere.

One section would be responsible for analysis of patent literature to keep abreast of recent inventions and for liaison with university and industrial research laboratories. It would solicit orders for experimental equipment and select recently patented items to be produced in the experimental shop.

The experimental shop should have capabilities in machine work, tool and die making, materials such as metal, wood, plastics, ceramics, and glass, electronics, welding, and the like. The heads of the various sections would be engineers or technicians experienced in experimental design.

As orders would come in for experimental equipment or models of recent patents, the shop personnel would make out detailed plans, work assignments, and the like. The students would be taught the necessary techniques in conjunction with the problems of making the various items.

Ordinarily, a student's early assignments would be in inspection and quality control, in order to familiarize him with the measuring and testing procedures and standards of performance. Later, students could check their own and each other's performances. By enabling students to obtain immediate knowledge of results, it would be easier to organize an ungraded instructional program with each student progressing at his own pace.

Products would be tested in the adjoining materials and equipment laboratory. Students would thus learn the reasons for choice among alternative designs.

As problems in basic science arise in the course of the work, appropriate instruction would be given in class and in the science laboratory. Items for which production in quantity is justified would be moved ultimately into the production shop, where skills requiring repetitive practice would be taught. To the extent possible, students would be taught to make themselves the necessary equipment and tools. The basic criterion would be instructional effectiveness, rather than economic efficiency.

For each item for which it seems appropriate, an economic analysis would be undertaken to determine a fair price under conditions of production in various quantities. Students interested in sales and marketing would be assigned to estimate the potential market. Appropriate literature describing items and their functions would be written. Periodically a graphic arts center and print shop would produce catalogues for distribution.

Of course, any marketing policy would have to rest on a price and wage system giving no unfair advantage over private enterprise. LEVER would have to be managed by a nonprofit corporation in such a way that income would be plowed back into the teaching, research, and development enterprise.

Nevertheless, it would be important to integrate into LEVER a broad program of education in sales, office work, and service occupations, as well as in the production trades. Of course, the print shop, the graphic arts center, and the offices would also be responsible for the appropriate educational programs.

In line with this general policy, LEVER would have a kitchen and a dining room that would operate educational programs in the restaurant–food complex. The usual school doctor and nurse service would be transformed into a training program in the health fields.

The students at LEVER should be taught to operate their own entertainment and recreational program. Certainly the graphic arts faculty should be teaching art for hobby purposes, as well as for occupations. There should be a section where students would be taught to make, repair, and play musical instruments, operate and maintain recording instruments, and the like. The same philosophy would apply to photography and film, stagecraft and costumery, and other related arts and trades.

In general, each section of the laboratory would be engaged in some productive work and would be teaching the related occupations. Each should have a wide enough range of activities to require tasks suitable to a range of skills.

The work of the research and development personnel will require secretarial and clerical help, data processing, library, and other services. The preparation of reports and texts will require graphic arts, printing, and distribution services. In the planning of LEVER, provision should be made for modernization of equipment through trade-in or second-hand disposal. Arrangements with industry should be made for experimental trial of newly developed equipment.

There should be some psychologists on the staff who are experts in task analysis. They would analyze, for each new item produced or new piece of equipment acquired, the skills required to make or operate it, the skills it would render obsolete, and the educational implications of such information. The administration of LEVER must periodically reconsider its program in the light of such analyses and those of manpower experts.

LEVER must have people on its staff who are responsible for liaison with employers and unions and who would often arrange for experimental trial of students in jobs. They would also make arrangements with unions for admission of graduates. Since it is likely that graduates of LEVER would not fit clearly into recognized categories of workers, either existing unions would have to make adjustments or new unions would have to be organized.

Of course, the research and development staff would include educators, scientists, and engineers who are experts in the industrial occupations taught at LEVER and in teaching the substance of preparation necessary for these occupations. But this staff would also include social scientists doing research on the students' learning and on the social and economic aspects of their work and training. There would also be graduate students, including those studying to be vocational educators, working with these scholars.

LEVER is conceived as a microcosm in constant ferment. If it is too narrowly designed, it will not be able to tackle adequately the kind of occupational mix that society must learn how to produce.

Notes

[1] U.S. Bureau of Education, *Cardinal Principles of Secondary Education*, Bulletin No. 35 (1918).

[2] U.S. Office of Education and National Council of Teachers of Mathematics, *Conference on Low Achievers in Mathematics* (in preparation).

[3] John L. Goodlad, *School Curriculum Reform in the United States*, Fund for the Advancement of Education, 1964; Paul C. Rosenbloom (ed.), *Modern Viewpoints in the Curriculum* (New York: McGraw-Hill, 1964).

[4] Everett L. Ellis, *Education in Wood Science and Technology* (Madison, Wis.: Society of Wood Science and Technology, 1964).